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# Precision SHOOTING



## REBUILT COLT SINGLE ACTION REVOLVERS

Top; .45 Long Colt old model frame. Center; .44 Special with matching .44 Magnum cylinder. Bottom; .38 Special on old frame. All were old guns which have been restored to handle modern loads. Refer to the article, "Rebuilding The Colt Single Action."

*a magazine for Shooters by Shooters*



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Editor—P. H. Teachout

President—Crawford H. Hollidge

Vice-President—Robt. Stinehour

Treasurer—P. H. Teachout

Clerk—Frederick G. Mehlman

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## AS THE EDITOR SEES IT

It seems from meager reports that there is some sentiment in some quarters that Precision SHOOTING should expand its content coverage in an effort to gain a bigger circulation. The editor would be in full agreement to expansion of content within the field of interest it is presently serving, but not for expansion to try to cover additional interest fields.

It is true that the circulation of the magazine is small, too small, and that it is rather too much of a hand-to-mouth proposition to keep the magazine a "going" project. That, no doubt, is largely a fault of the editor in not making enough of the right kind of effort on circulation promotion. That is one of the editor's too many weak points. The editor is fully aware that there is almost unlimited room for improvement of the magazine; the problem is, to do it. There are limitations that we have to work within.

As for the present interest coverage versus expansion to cover additional fields of interest, this is how the editor sees it:

The organized shotguns have their own organization magazines covering their own interest fields, both trap and skeet shooting. The muzzle loader enthusiasts have their own organization and magazine covering their particular interest field. The United States Revolver Association has its own small magazine serving the interests of its members. All of the shooting sports have some limited coverage in the big circulation hunting and fishing, and over-all coverage gun magazines.

Up to some 20 years ago the official magazine of our National Rifle Association was largely devoted to the interests of rifle and handgun shooters, with the riflemen in somewhat of an ascendancy. With the National Rifle Association's present greatly expanded membership, with a greatly broadened interest base, its official magazine has to try to be "all things to all men." We shooters need the great membership strength of the NRA, and we feel that the AMERICAN RIFLEMAN is serving ALL the NRA members as well as any magazine can serve such a great and diversified membership.

So far as we know, Precision SHOOTING is the only periodical with a national circulation which is exclusively devoted to the interests of sport shooters of present day rifles and handguns. It is also, so far as we know, the only periodical serving so largely as an open forum where readers may relate their experiences, pass on information they have gained, and freely discuss shooting problems. It has been the editor's goal to make "a magazine for shooters by shooters" a fact rather than just a phrase.

It is the editor's continuing belief and opinion that there is a place in the shooting

world for a periodical such as Precision SHOOTING. There is expressed evidence that there are others of the same opinion. There are no doubt many other riflemen and handgunners, not yet acquainted with Precision SHOOTING, who might welcome such a magazine. It shall be our continuing endeavor to make contact with those people as we may be able. A bigger subscriber circulation is desirable from the standpoint of economic stability, and it also extends the sources from which reported experiences, information and discussion subjects may come, to make the magazine of even more interest and worth.

## INFRARED HEAT FOR OUTDOOR RANGES

THE FOSTORIA CORPORATION, with twenty-five years experience in designing and manufacturing infrared direct radiant heating installations for locations impossible or impractical to heat by other conventional methods, is now offering a new line of electric infrared Comfort Heaters for direct radiant heating of outdoor firing ranges. An 8 page bulletin CH-100, which describes this method of heating, its advantages and applications, may be obtained from the FOSTORIA CORPORATION, Huntingdon Valley, Pennsylvania.

From the information in the Bulletin, it would seem that this method of heating firing points might be of special interest to those enthusiastic shooters and shooting experimenters who wish to shoot over outdoor ranges throughout the year in the colder climates. It would seem, from what information we have, that a relatively inexpensive three walled and roofed firing point shelter would be practical with the infrared heating. The open side of the shelter would permit a full view of the entire target area (a real safety feature) and might largely eliminate the mirage bugaboo that plagues shooters when firing through ports in the wall of an enclosed and conventionally heated shooting house.

The application of the infrared direct radiant heating to firing points of larger outdoor ranges would appear to make firing points enclosed on three sides desirable if not absolutely necessary, and that might be a step in the right direction; it could be a desirable boost for the present trend toward more outdoor position target shooting. Our present requirements for only a roof on covered firing points are only a hang-over from the primitive rough-tough-and-nasty wide-open ranges of a by-gone day.

Competitive target shooting is a participant "game." Games are presumed to be designed for the enjoyment of the participants. So, why not consider making the environment for playing our shooting games more comfortable, practical and desirable?

PHT

## HOLLOW POINT BULLETS

The original purpose for hollow-pointing bullets, both rifle and handgun, was to secure better and greater expansion of the bullet in its passage through animal tissues, thereby creating a greater wound area for a given diameter bullet than would be the case with a solid point bullet.

The rate and extent of expansion of hollow point bullets is governed very largely by the speed at which the bullet is driven. In general, the higher the velocity at which a hollow point bullet is driven, the faster and greater its expansion will be. The "temper" of cast lead alloy bullets (or cores of jacketed bullets) also has a bearing on expansion rate; the harder the alloy the slower the expansion rate.

In the days before jacketed bullets, the lighter weight bullets in a given caliber were most generally used in the hollow-point de-

sign, since the lighter weight bullets could be driven at higher velocities with the propellants then available. Even today, it is generally the lighter weight cast lead-alloy handgun bullets in hollow-point design that are used, due to the velocity limitations of most handgun cartridges.

With the advent of jacketed bullets and smokeless powder, and the much higher attainable velocities, the main objective in making hollow-point bullets remained at assuring fast bullet expansion. Light weight bullets, with relatively thin jacket walls, driven at high velocities, gave "blow-up" expansion on contact with animal tissue; generally quite complete break-up or disintegration on flat-angle contact with the ground, and "flat" trajectories. All those features of hollow-point bullet loads were (and are) desirable in shooting small, varmint type animals, but quite undesirable for shooting larger game animals, for which adequate penetration as well as expansion is necessary for quick killing wounds.

Until quite recently commercial hollow-point jacketed bullets available have been in the lighter weights for any given caliber and intended (or commercially loaded) for use in shooting the small varmint-type animals and birds. To the best of our knowledge, only a very few hollow-point bullets in heavier weights, intended for heavier game shooting, have been commercially made.

With the beginning of competitively shooting rifles from bench rest, some fifteen years ago, it was soon found that the quality of the bullet was one of the most important factors influencing rifle accuracy. The shooters who started present day competitive bench rest shooting were, in the main, varmint shooters with a bent for experimenting to further improve the accuracy and effectiveness of their rifles. The .22 cal. center-fire, high-velocity cartridges were the proven best for varmint shooting at that time and that was the rifle caliber most generally used for bench rest competition. In the beginning, most shooters used bullets that were commercially available at the time; mainly the products of the individuals and small companies that had started production of customized bullets only shortly before.

The ammunition-component-lean World War II and immediately succeeding years had started some do-it-yourself shooters to hand-making their own .22 cal. bullets, using jackets made from fired .22 rim-fire cartridge cases, and recently designed bullet making dies and swages were already on the market at the start of present day bench rest competition, as well as commercially produced bullet jackets.

Some of those earliest competitive bench rest shooters right away started making their own bullets and experimenting to find ways to produce bullets that would give them improved accuracy. As early as 1948 a majority of the aggregate average winners were shooting bullets they had made themselves, or that a friend had made for them.

The do-it-yourself bullet makers soon found by experiment that bullets "soft-swaged" (so-called) with deep hollow points and the lead cores only barely extending into the point section (ogive) of the bullet, gave better consistent accuracy than did bullets formed with the lead core entirely to the point with an exposed lead tip (soft-point type).

Two reasons are given to explain the reasons for the better accuracy of the "soft-swaged" hollow-point bullet: First, the pressure required to form the bullets with lead to the tip is great enough that it tends to expand the steel die, itself, a tiny bit. That when the forming pressure is released the contracting steel die tends to reduce the diameter of the softer bullet that tiny

bit. Then, when the bullet is expelled from the die, the springy metal jacket tends to spring away from the inert lead core and possibly loosen very slightly, the pressure bond between core and jacket. In "soft-swaging" the bullet, the pressure required to form only the comparatively thin copper jacket walls to the point shape is so much less that no expansion of the die itself occurs, and when the bullet is expelled from the die the "springy" tendency of the jacket wall is inward, toward the lead core, thus maintaining or increasing the bond between jacket and core.

Second, should the die form a bullet with the point section not precisely concentric with the bullet body, the light hollow-point section would upset the balance of the bullet less than would the heavier, lead-filled point section.

Until 1948, slugs of soft lead wire, cut to as nearly uniform lengths as possible, were placed in the bullet jackets and expanded under pressure in a "core-seating" die. For the most precisely uniform weight bullets, the bullet makers had to resort to weighing jacket and core together, filing or shaving the base of lead core until the desired exact weight was obtained. This greatly slowed up the bullet making. Then, too, there was the possibility of trapped air forming pits in the surface of the cores, next to the jacket walls, to slightly upset bullet balance (and the high-hopes of the shooter). Jonas Hallgrímsson, then a resident of Massachusetts, found by careful examination that these trapped-air pits were frequently present between core and jacket wall.

In 1948, following suggestions by Hallgrímsson; Sam Clark of Maine, one of the early do-it-yourself bullet making experimenters; and others, Ray Biehler of Rochester, New York (the "B" of B&A dies, with Walt Astles the "A"), introduced the "uniform weight core forming die" and started beating the drum for the EU (expanding-up) principle of bullet making.

The uniform weight core is produced by feeding a cut lead wire slug, slightly over the weight of the desired core, into a die provided with "bleed-holes" through which the excess lead is extruded when the core is formed to shape under pressure. The die forms the core with slightly tapered sides, to closely fit the inside contour of the bullet jacket, and a slightly rounded tip on the smaller end. In seating the core, the smaller end of the core goes to the bottom of the jacket, the rounded tip starts expanding first when pressure is applied, expelling any air that is present out between the core and jacket walls as the core is progressively expanded from the bottom up, which entirely eliminates any air-trapped pits between core and jacket wall.

Bullet jackets have a slightly smaller outside diameter than the bullets that will be made from them. (.22 cal. jackets I have are .2225" O. D. and .30 cal. jackets are .3065" O. D.) In the "expanding-up" system of bullet making the core-seated jacket will have been expanded to an outside diameter very slightly under the diameter of the finished bullet. In the bullet swaging (forming) operation the jacket will be further expanded to the finish bullet diameter. Since the springy jacket material has been expanded outward, any spring-back tendency is toward the inert lead core, thus assuring a tight bond between core and jacket wall.

While some of the original bench rest shooters continued to make their own bullets, the concerns specializing in bullet making on a commercial production scale were not asleep. Since the bench rest matches served as a proving ground for their .22 caliber bullets, these people kept in close touch with the bench resters, improved

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their bullets, and the growing number of bench rest shooters used them—and won with them. As late as 1952 the majority of bench rest shooters, and majority of aggregate average winners as well, were shooting commercially produced bullets. Sierra bullets were the leaders in popularity, with lesser numbers shooting bullets by Hornady, Sisk and others with success.

About 1951 or 1952, Ray Biehler and Walt Astles introduced matched sets of core forming, core seating and swaging dies which turned the tide of do-it-yourself making of hollow-point bullets of superior accuracy, and have since become the standard by which other bullet making die sets are judged.

At the Johnstown, New York, Labor Day Shoot in 1953, 20 of the 95 shooters were shooting the home-made hollow-point bullets, and 10 of them were among the 14 top match winners.

All new national bench rest records made in 1953 and 1954 were made by shooters using home-made hollow-point .22 cal. bullets. At the Johnstown, New York, 1954 Labor Day Shoot, 67 of the 91 shooters reporting were shooting home-made hollow-point bullets. At the first National Championship bench rest competition in Custer, South Dakota, later that month, with competitors from all sections of the country, 42 of the 77 competitors were shooting home-made hollow-point bullets.

That trend has continued and at present it is extremely rare to find anything other than hollow-point bullets being shot in a bench rest match, the majority being home-made and in .22 caliber. Sierra Bullets went with the tide of change and brought out their 53 grain hollow-point "bench rest" bullet and Speer Products Company did likewise with their 52 grain hollow-point "bench rest", both of which have given excellent accuracy, have won gates. No doubt the failure to win aggregate bench rest matches but few aggregates is largely due to the fact that the more experienced bench rest competitors, who usually win the aggregates, have been making their own bullets for a number of years, and beginners tend to follow the example of the winners.

The foregoing has been essentially an accuracy "case history" of .22 caliber hollow-point jacketed bullets. It would seem that bullets of larger calibers, made according to the same system, in the same general designs, should give as good comparable accuracy results. Shooters who have made their own larger caliber bullets according to this system have found that to be true, with bullets giving very excellent accuracy to at least ordinary hunting ranges (300 yards or a bit more), and in weights heavier than are ordinarily considered "varmint" bullets. Recent bullets of the same general construction from the commercial bullet makers have given further proof of the accuracy worth of this type of bullet.

When the Sierra .30 caliber 110 grain hollow-point bullet was introduced I shot a sample hundred of them and considered them the first 100 grain .30 caliber bullet to give accuracy good enough to be termed real varmint bullets. Subsequent shooting

of these bullets purchased at a local store have not changed my opinion of them in the least.

When the Hornady .25 caliber 75 grain hollow-point bullet was introduced I shot a sample hundred in a heavy barrel .257 Roberts rifle I was then using with very excellent accuracy.

The past season I have shot some 200 of Speer .30 caliber 130 grain hollow-point bullets which have given me average accuracy very nearly as good as my home-made .30 caliber bullets average.

Sierra developed a .30 caliber 168 grain hollow-point boat-tail International bullet that was used by the U. S. shooters in the 300 meter shooting at the Pan-American Games rifle matches in Chicago. The bullet was later made available commercially and has established an enviable accuracy record.

I won't argue the accuracy worth of the hollow-point bullets for long range target shooting in suitable calibers. It may well be that the lighter weight and lower sectional density would make them too wind-sensitive over the 1000 yard range (but 1000 yard target shooting is a very small part of the total of all target shooting).

During the 1960 season I shot two 20-shot matches at 600 yards, using my own home-made .30 caliber 145 grain hollow-point bullets, made in Sierra 1.085 inch jackets, loaded in Win. 308 cases and fired in a Savage Model 110 featherweight sporter rifle with 4X hunting scope. Too many shooter blunders resulted in poor scores but from those experiences I am quite convinced that a competent shooter, shooting those bullets in a target rifle with suitable loads, could reasonably expect to make high V-count possibles on the Army B target at 600 yards, under reasonably good wind conditions.

It seems safe to state that bullets made according to the "expanding-up" principle, with the lead cores extending but very little into the nose (ogive) section, have proven that hollow-point bullets may be of superior accuracy.

Hollow-point bullets made in some of the lighter, thinner walled jackets available, and driven at velocities in the over 3000 F. P. S. range, do give reliable "blow-up" expansion on small varmint type animals as well as superior accuracy.

Some recent experiences make me wonder if some of the home-made hollow-point bullets may give the good penetration with reliable expansion necessary for shooting such common big game as whitetail deer and black bear.

In the Fall of 1959 I shot a good sized white-tail buck with one of my home-made 145 grain .30 caliber hollow-point bullets, loaded in the .308 Win. cartridge. A well placed broadside chest hit at close range gave through-and-through penetration with a sizable exit wound. The trotting deer did not falter at the hit but went down to stay within 50 yards.

In the Spring of 1960 I gave a local friend some of my home-made bullets to try in his rifles (.30 cal. 145 gr.). Recently

(Continued on Page Nineteen)



## REBUILDING THE COLT SINGLE ACTION

By Edward M. Yard

The Colt Single Action is back, but there are still thousands of old ones around waiting to be rebuilt. Many of these need only a few new parts and refinishing to become just as serviceable as a new one at \$125, if you can get delivery. Others will require new barrels and cylinders, and a lot of polishing and adjustment. Even these can be remade into excellent guns at little more than half the new price, including the cost of the old Single Action. If you happen to want it in .44 Special, this is the only way you can get it.

This article will describe a pretty complete job, and yet no power tools are required, although I use and refer to a small 4" bench grinder. All of the techniques and operations are simple ones.

The first step is to examine carefully the prospective rebuilders. The frame must be sound and undamaged. If pitted, it must be possible to clean it up to suit without weakening it in any way. This applies as well to the triggerguard and backstrap, except that somewhat more polishing may be done without harm.

The first one I rebuilt had a low number frame (no collector's item!) that had seen plenty of wear. It was worn, nicked, scratched, pitted here and there, minus front sight, ejector spring gone, and screws looked like boot nails. It was plenty rough (that's why the price wasn't in the collector's range,—and out of mine). However rough it looked, it was not damaged; it was mechanically sound. That is the test.

Caliber does not matter, nor do a few missing or broken small parts. Colt's now make all small parts, cylinders, 5½" and 7½" barrels in .45 Long Colt, .44 Special, and .38 Special. If you do not like the original caliber, or if the barrel and cylinder are in poor shape, replace them for one of the above excellent cartridges. You can save the old barrel for smooth boring, if shot pistols appeal to you.

For a start the gun should be completely disassembled, if you have not already done this. Begin by taking out the cylinder. The pin may be stuck, and the bushing frozen in the cylinder. In this case someone has probably marred the pin and adjacent areas trying to get it out with a pair of pliers. Here's how to take it out.

Remove the grips, the backstrap, mainspring, triggerguard, lock parts and hammer. This will expose the rear end of the pin. Take out the pin locking bolt or pin retaining screw as the case may be (high or low numbered gun). Squirt all over with a penetrating oil, and, if in a hurry, in about ten minutes try tapping it out with a drift pin and light hammer. If this does not start it, soak as long as possible in the penetrating oil. What's a good oil? There are lots on the market. On one very stubborn screw I tried Coca Cola, and it worked too.

If the cylinder bushing is frozen, find or grind up a pin to fit the bushing closely, but clear the cylinder bore. My first one had to be driven all the way, and without this precaution would have been damaged. Soak in penetrating oil as long as convenient. Use wood blocks to support the frame and cylinder for this driving, and be careful how you do it.

The gun is now apart except for the barrel in the frame, the ejector, and the gate. There is a screw running in from the bottom of the frame which positions a spring and catch that retain the gate. The ejector housing is held by a single screw, and may be pried off the stud.

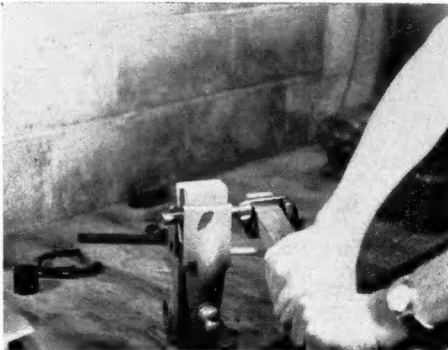
To take out the barrel, make up a pair of hardwood blocks to fit it. Pieces of oak about 1"x3"x3" are good. Clamp the



Two Colt S. A.'s before rebuilding. Sound guns in NRA Good condition but well worn.

blocks together and drill a 5/8" hole along the common faces and across the grain. This hole will upset to a good contact on the Single Action barrel. After using them to take out the old barrel, the groove will fit the new barrel without marring it.

Clamp the barrel in the blocks with a good 4" jaw bench vise with the gun in normal sight up position. Grip it rather tightly, and slip a 1½" square billet of wood or a strong hammer handle through the eye of the frame of the disassembled gun. Turn counterclockwise. Should the barrel slip, apply powdered rosin and tighten the vise. Stiff ones will take about a 12" to 14" lever. If it does not start, use some penetrating oil; soak for a day or two.



Screwing a Colt S. A. frame to final position on barrel using a 14" long stick of wood to turn it.

The next step is to order those parts which examination shows should be replaced. In my case this included the barrel and cylinder, largely because I wished to change the caliber. I elect to keep every possible small part, even though on a profit job it would be cheaper to replace it.

I like to start on the small parts while waiting for the new stuff to arrive. That way I am not held up at the end for a screw. If you wash the screws in gasoline, and clamp them, head showing, in the vise with blocks of wood or lead, they can easily be trued up. If badly battered,peen carefully to cold forge some of the metal back into place. Then use small Swiss pattern files, and a smooth mill file to reshape the slots and bring the head as nearly to the original contour as you can. Use light pressure and a well chalked file. There is not much cutting to do, just a truing up job, and the less metal removed the better. A knife file is good in the slots, and a round edge joint will help clean up the bottoms. A fine rubber abrasive wheel or crocus cloth will give the heads a final polish. The

whole batch of screws can be cleaned up in an hour.

Usually the hand, hand spring, bolt, bolt and trigger spring, and trigger are all right if not broken. They may need a little cleaning and polishing. If damaged, they must be replaced. The point of the trigger will usually require some stoning to get the best trigger pull. It is necessary to check the hand to make sure that it rotates the cylinder far enough to insure the bolt locking every time, and to check the fit of the bolt in the cylinder cuts. If the hand spring is badly worn, replace it. It may be driven out sideways, and the new one pressed in with the vise. Start the spring with a brass or wood block.

The bolt and trigger spring is one of the important parts for proper functioning of the gun, and if worn or damaged should be replaced. A slight tapering of the spring fingers is all right, and this is often done intentionally. There should be no rust, nicks, or cracks.

Examine the mainspring carefully. If it appears to be all right, it probably is. The best test is snapping it. The standard spring will give good service, but they do break. Some old time shooters backed off the screw a half to a full turn, and claimed that this prevented breakage. I use the Newman two-piece Far Country spring, or a single spring with a recurved tip in my own Single Actions. The Newman spring is said to be unbreakable, nor have I seen one fail, as I have with the regular spring.

Note that the bolt, trigger, and hammer screws serve as pivot pins for these parts. They must be tight, straight, and unworn. The cylinder pin and bushing, if useable, will require only cleaning and polishing. Their diameters cannot be changed at all. Whether or not the bushing fits, depends upon the cylinder it is to be used with, and will be explained with fitting the cylinder. If the pin can be polished with crocus cloth (perhaps after cleaning with some fine steel wool and gasoline), and the head smoothed up, it can probably be used. Make sure that it is not loose when put in the frame. A battered pin head should be peened lightly first, to push down the upset metal, and then polished on the fine rubber abrasive wheel. A Swiss pattern file, knife, triangle, or even half round will clean out the circumferential grooves. Even a rather poor looking specimen will respond to this treatment. When blued, its sad past can scarcely be detected.

If the hammer notches are broken out, you will need a new one. They can be repaired, but this will cost nearly as much as a new hammer. The old firing pin may be

broken, worn short, or too blunt. It is removed by driving out a small retaining rivet and pulling the pin. Be sure to use a drift pin of the right size to fit the rivet; it should tap out easily. Putting in the new one will be obvious. The full cock notch may need to be stoned up, both to true it, and to get a good trigger pull. Polish the spur if it needs it, but go lightly on the sides.

The ejector tube can stand quite a bit of polishing without damage. I usually clean them up on the four inch rubber abrasive wheel, using light pressure and rapid traverse with the tube held at right angles to the wheel. Files and crocus cloth are also used in the usual fashion. The cloth may be wrapped around a dowel or pencil, and on convex round surfaces a shoeshine action does wonders. If the spring, rod, or head are damaged, replace them. It is hard to do much with these. Often the ejector rod head seems bent. Actually it is the rod which is bent, and any attempt to straighten it by bending on the head breaks the rod at the root of the threads. Sometimes the rod can be straightened with the head off.

There is not much to do with the frame except to clean it up and polish it a little. It is either all right, or you don't want it. Plastic surgery jobs are not for the inexperienced. The top strap can be filed or polished lightly to remove nicks or very shallow pitting. A single small local pit, or a few scattered ones may be ignored; when the gun is refinished they will not show too much. The recoil bells and the gate will stand somewhat more cleaning up, but are hard shapes to work on. Polishing on the sides of the frame should be done with a flat block to back the abrasive cloth and thus avoid hollows or rounded edges. On convex surfaces use an Art-gum eraser behind the cloth. Do nothing to the inside of the frame except to clean it. This may be quite a job with tooth picks and small brushes, gasoline, rags, cord, or anything that will get into the corners and holes. Give it a real cleaning; it's stepping out anew.

The triggerguard and backstrap will take a lot more polishing without damage. The rubber abrasive wheel can be very useful. Use light pressure, moving the piece smoothly in long swings. Any dwell means a hollow. Work on the flats with abrasive cloth wrapped on a wood block. Finish with a shoeshine motion for the curved areas.

In polishing it is not necessary to get a shine, but rather to blend surface mark-completing the polishing, I like to brush the ing and achieve an even texture. After whole surface with a fine wire wheel. Minor defects are not so noticeable as when a mirror finish is attempted.

Now we come to the real work; fitting the new barrel and cylinder. This is not too hard if you get in mind what you are trying to accomplish, do things in the right order, and check yourself as you go. If you do not have a set of feeler gauges, borrow them. Try the cylinder bushing in the cylinder. If it is an old one, be sure it is not too loose.

With the bushing in the cylinder, put the cylinder in the frame, and slide in the cylinder pin. Check the end play. A very little is necessary to prevent binding, but over a few thousandths is excessive. Check headspace (yes, revolvers require proper headspacing too). Hold the cylinder ratchet tight to the rear of the frame, and measure between the rear of the cylinder and the frame. This should be .060" minimum. Then check with the cylinder pushed forward. This should not exceed .065". The new cylinders are usually about right as received, but should your measurement of minimum headspace be too large the face

of the ratchet must be stoned down. Before doing this, be certain of your measurements, and be sure to turn it often to keep the face square. Use Prussian blue on the frame to check the fit. If the maximum headspace is exceeded, a new bushing will be required to cut down the end play. It is probable that a great many guns run over the .065" max., but it is better to stay pretty close to this when setting them up with new parts.

New bushings ordinarily have to be fitted, as they are supplied too long to let the cylinder enter the frame. The front end of the bushing where it fits into the cylinder has a head with two shoulders. These control the fit in the frame, and both of them must be cut down, because, if the whole cut is taken on the forward end, the entire shoulder will be removed. The smaller bearing area will then wear faster. Most well worn guns exhibit this condition. Of the two, the shoulder that bears in the cylinder can be the thinner, as it wears the least. This job is most easily done in a lathe, but I have done several by hand. Either way, use a micrometer or vernier caliper to check your dimensions, and try the bushing and cylinder in the gun often enough to avoid cutting off too much. With a small, fine file work on the inside shoulder first, taking off a little more than one half of the total cut, and stone smooth. See description of filing barrel shoulder further on for details on technique. Work up the final fit on the front shoulder, filing from all directions across the work to keep it flat. Stone smooth to final dimension so that it will go in gun, but without play.

This should give you a properly fitted cylinder with correct headspace, and this work must be completed satisfactorily before attempting to fit the barrel, because it is fitted to the cylinder. I should point out here that new cylinders will vary slightly in length, as much as .005". This means that a new cylinder cannot always be installed in a gun without refitting the barrel to it.

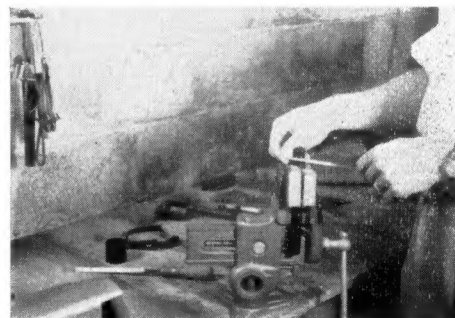
Try the new barrel in the frame. It will probably be too tight to go in all the way to the shoulder. Mike the threads on the old and the new barrel. The threads on the new barrels are a few thousandths oversize and tapered. This makes them start easily and come up tight. I find that the following procedure will quickly produce a good fit.

Make sure that the threads in the frame are really clean, then etch them with a 30% solution of phosphoric acid. Apply this with a cotton swab, and let work about five minutes (don't get any on the rest of the gun). Phosphoric is self inhibiting, and it won't hurt you or the gun, but it will remove blue. It serves to get out any old oxide or metal powder, and to clean up these inside threads. Rinse thoroughly and dry. Now, with very light pressure, just a touch, twirl the last few threads next to the shoulder on the barrel against the fine rubber abrasive wheel. This is barely to knock off the burr, and your micrometer caliper should show about .0015" gone. Tape the barrel so that the grinder guide will not mark it.

It should now go in with finger force to within one turn or three quarters of seating. This is about right. Each turn moves the barrel in .050". So, when the barrel is exactly one turn out, measure with your feeler gauge between the frame and the barrel shoulder. This should show a little less than .050", and the difference between your reading and this is the amount that must be filed off the shoulder. The front sight will then come exactly vertical with the barrel in tight, and the ejector lug will line up. Don't ever be tempted to take this cut off the frame.

With the cylinder in place, screw in the barrel until it just touches. With the feeler gauge, measure between the shoulder of the barrel and the frame. This dimension plus the amount you have already determined must come off the shoulder, is the minimum that must be removed from the breech end of the barrel. The final clearance will depend upon how tight you think it can be without the risk of binding. Perhaps .002" is the minimum that it is safe to try.

A lathe can be used for this fitting, but it is just as fast to do by hand with files, as it is to make the setup on most lathes. I use a 6" Swiss pattern tapered half round file on the shoulder. The teeth should be kept clean (by brushing) and well chalked. Clamp the barrel vertically in the vise. Use the round side of the file, swinging each stroke through about a 30° horizontal angle and with an arcuate rocking motion of about 60°. The file is pushed and swung along and around the shoulder, and at the same time rocked, as if scraping the metal out. The purpose of this is to get a flat and even cut. Work smoothly and regularly around the shoulder, trying it every few circuits, as you are probably only to take off .005" to .009". Use Prussian blue to check the fit against the frame. This system works remarkably well, and it is very easy to do. I have always gotten a perfect fit with little work.



**Filing down the shoulder of a barrel using arcuate motion to keep surface flat.**

You will be taking more metal off the breech end of the barrel, perhaps .040" or so, and thus this will be more work and harder to keep even. Clamp the barrel as nearly truly vertical as you can get it. Use vise so that you can file from three or more directions at least 60° apart. Watch your cut, and work as evenly and smoothly as an 8" or 10" smooth cut mill file. Set the you can. Try the barrel often, using the feeler gauge between the shoulder and the frame to keep track of how much more metal you must remove, and how much you are taking off each time around. Put Prussian blue on the face of the cylinder to show up high spots, and use the feeler gauge to measure the low ones between the cylinder and the barrel. Try to even these up gradually, and come down to final fit square. Because the barrel is tapered, the usual try square will not help, unless you use the feeler gauge with it.

I am satisfied if I can fit one up to between .002" and .003", with .001" variation as checked by the feeler. This is closer than most factory fits, and I am always afraid that anything tighter will tie up. You may bring the final fit in with a stone, which will give you a smoother finish, but take longer.

When this fitting is completed, you should just be able to turn in the barrel to a stop with the front sight exactly vertical using about a 10" lever on the wood billet through the eye of the frame. Clamp that barrel tightly enough not to slip it and mar the excellent factory finish. With these

(Continued on Page Fourteen)



# TOURNAMENT CIRCUIT



Robert Wright, member of Miami Valley Rifle Team of Englewood, Ohio, winner of 100 shot offhand rifle match.

## OHIO 100 SHOT OFFHAND MATCH

Robert Wright, Miami Valley rifle team member, fired a 954 to win the 100 shot offhand match conducted by the Western Ohio Rifle League for the second consecutive year. Mr. Wright is also the League record holder for the four position course.

Claude Arstingstall, another Miami Valley team member, fired runner-up score of 935. John Turnbull, Springfield, and Ivan Grilliot, ---nnie Oakley, tied for third place, each with a 930 score.

High expert, Enos Macy, and high marksman, Frank Rodgers, each shot a 902. High sharpshooter, Howard Helping, scored 891, as did Mike Costello and Robert Rarick who tied for second in expert class. Costello was high junior shooter.

John Turnbull made the best single target, a 99.

## METROPOLITAN RIFLE LEAGUE

The Roosevelt Rifle Club No. 1 team of E. Clausen, A. Rosenblatt, Irwin Tekulsky and Walter Tomsen scored 1599-122x to win the annual Metropolitan Rifle League club team match, fired over the 100 yard indoor course in Brooklyn, N. Y., on January 12th.

The Philadelphia Rifle Club of H. Palmer, Sr., H. Palmer, Jr., A. Cutillo and H. Masterson scored 1593-101 for second place. Madison Rifle & Pistol Club team of F. Triggs, R. Triggs, M. Jury and P. Murray took third place with a 1592-112 score. Fifteen four man teams competed.

In the two man team match on the same date, Walter Tomsen and Fred Cole topped the 33 team field with a 799-70x score. Fred and Rans Triggs scored 799-64; Irwin and Sam Tekulsky 799-62; while E. Clausen and Harry Stone rounded out the 799 tallies with 54 X's.

Rans Triggs had the only individual aggregate possible, 800-72x. Walter Tomsen had 799-71; John Holle and Sam Tekulsky each 799-61; Irwin Tekulsky and E. Clausen each 799-59; Lloyd Norton 799-55 and Harry Stone 799-53.

## CALIFORNIA HIGH POWER

Henry Wright, Fresno, won the January 8th Valley Shooting League .30 caliber match with a score of 247-24V for the 200 and 300 yard course of fire. The match

was fired on the Fresno Rifle Club range. Dick Abbott, Sangre, scored 242-24; Don Pattee, Orosi, 242-20; Wallace Ley, Orange Cove, 241-21; and Wm. Clough, Porterville, 240-21.

Bill Reetz, Fresno, had high 200 yard standing score of 50-5V. Dick Abbott was high for the 200 yard rapid stage with 50-9V and Henry Wright was high in the 300 yard rapid with 50-7V. Bob Perkins and Wm. Clough ranked one-two in the 300 yard prone slow fire stage, each with 50-9V. John Weldon was high in the 300 yard sitting slow fire stage with 50-4V.

## NOTES FROM AUSTRALIA

**TARGET SHOOTING:** (Excerpts from letter of Lorne Humphrey, N. S. W. to Henry Woltman, Minnesota.)

Reading the programme of the National Matches was very interesting—your NRA certainly embraces all types of shooting. One feature that struck me was the high scores obtained in the High Power section. I could not possibly expect to get scores like that with the SMLE Lee Enfield even if it were fitted with a telescope sight. The Lee Enfield .303 has proved a very efficient military rifle; it will operate under all conditions and is one of the fastest military bolt actions; however, for action strength and accuracy it cannot match the Mauser type action.

To obtain the maximum accuracy from his rifle the Australian marksman must use all the resourcefulness and ingenuity he can muster. The orthodox or "conventional" method is to bed the barrel and pack it on top with some material such as cork in order to ensure a lasting and constant pressure of the barrel on the forend. Other methods are to float or semi-float the barrel and the latest method employed, which is giving good results, is to float or semi-float the barrel and have it held in place very firmly at the muzzle by means of a rubber grummet placed in the nose cap. I suppose just about every method imaginable has been used at one time or another.

Because of its slow velocity (approximately 2200 f. p. s.) the .303 is rather susceptible to wind changes, even at 300 yards. At 600 yards an 8 m. p. h. cross wind would require about 6 minutes alteration, amounting to say 3 feet at the target. On long ranges, such as Anzac, there are plenty of flags to indicate the strength and direction of the wind. When shooting at long ranges in the rain the flags become heavy with the rain and if the wind is not strong the flags will not lift. Since, however, a slight wind may cause an "inner" at 800 or 900 yards, one may have to rely on a keen observation of the slant of the rain.

The Australian marksman makes much use of the mirage for judging the wind. This is done by setting the spotting scope slightly out of focus, so that the mid-range mirages comes clearly into focus. The target is slightly out of focus but clear enough to see the spotting disc. Mirage can be seen in both winter and summer at Anzac but the winter mirage seems untrue at times. Mirage is considered the best indication of changes in strength and direction of the wind, but is useless for wind over 8 or 10 m. p. h.

Barrel mirage causes much trouble on a still, hot day. The one-piece handguard seems to reduce it some.

Artificial protection from sun and rain by way of covered firing points or the like is not permissible—only such protection as is provided by the hat and clothing. In competition matches, shooting will cease because of rain only when it is impossible to sight or at the discretion of the Chief Range Officer. It is therefore wise to have a complete set of wet weather gear and a good wide brimmed hat. The barrel and action may be protected with plastic sheeting or similar material, provided it is not used as a shade or shield for the sights.

A wet cartridge in the SMLE No. 1 (Mark III) can be disastrous at the long ranges; a miss over the top of the target at 900 yards can be expected. It is therefore imperative to keep the action and ammunition dry.

Mittens or gloves may not be used and the sling may not be artificially supported by means of a clip or button on the upper arm. Sling maximum width of 2 inches. Time limit is strictly 45 seconds per shot.

Practically all ranges (whether it be of many targets or few) in Australia go back to 900 yards and at least to 600 yards.

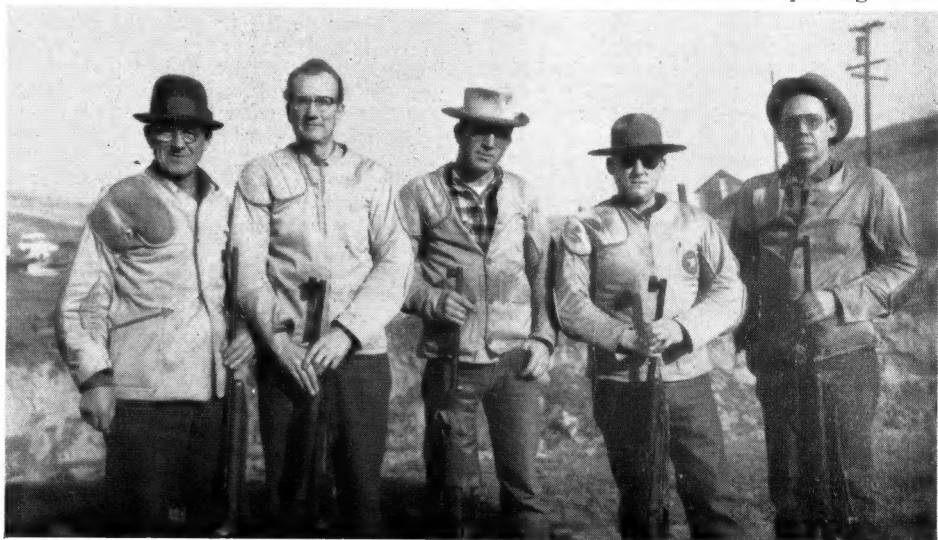
Let me give you a glimpse at the average Australian rifleman's equipment and method of shooting.

Rifle is the SMLE No. 1 (Mark III) with Australian heavy barrel, blade foresight and aperture rear sight fully adjustable for elevation and wind.

Spotting scope is either the draw telescope type or the prismatic type of 20 to 25 mag. Scopes of over 25X are not considered desirable.

Shooting box or bag to hold cartridges, cleaning oil, filters, bullet lubricant and other odds and ends.

As far as clothing goes a wide brimmed hat (generally in need of much repair) is essential. Caps and the like are no good. The shooting coat is usually home-made from some old discarded coat or army surplus. Elbow and shoulder padding is not



California high power match winners. Left to right; Henry Wright, John R. Miller, Don Pattee, Dick Abbott and Wallace Ley.

excessive, in fact I personally prefer no shoulder padding—only some material such as kangaroo leather which will give a solid non-slipping surface for the rifle butt. And don't forget the raincoat (plastic) and waterproof trousers for wet weather.

**HUNTING:** (Excerpts from a letter to the editor from Tom Wardle in Melbourne.)

Here is a brief and not full account of the hunting in Australia which you may like to put in the mag.

The seasons in Australia are different to the USA as we are in our summer (December) and it can get up over the century mark in heat even here in Melbourne (you'll note on the map we are far down south) whilst in the centre and upwards, the temperature is 100 to 120.

In Victoria we do not have any hunting seasons except for duck, snipe and quail and although the kangaroo is protected here it is hunted under license on farms where they are causing damage. Our state is not very good for hunting but the hunting improves as one moves up North through NSW, Queensland and the Territory. (few), rabbits, hares, foxes, roos, duck, quail, snipe and four species of deer—red, sambar, hog and fallow. We only require licenses for ducks and there is no need for wearing red clothes, etc. We hunt at any time and by any method, the only restrictions being not on Sunday nor trespassing on private property or sanctuaries.

As you go up north, you strike more game in the form of wild pigs, goats and roos. Then you get onto crocodiles, buffalo, wild dogs and horses, camels, etc. Our greatest regret here is that we do not have more deer, like New Zealand—deer were released here before NZ.

Deer are hunted by dogs, spotlights and very few are taken by stalking, and as we have no season, the position will become worse; but a few of us are trying to get something done about it.

The quantities shot here will no doubt surprise you but please remember that they are vermin and the farmer on the large outback stations really likes us cutting down his unprofitable eating herd such as roos and rabbits.

My hunting figures are not very large compared to some in more abundant areas but they may serve to illustrate the picture, although these large figures do not represent average tallies.

On wild pigs, which sometimes kill lambs, the best shooting I've had is 28 in 2 hours, stalking on foot with the help of a fellow shooter. A pal in Queensland shot 105 in 4 days. They pay a bounty up there in some districts.

Out spotlighting in NSW, I've shot 35 roos in 1½ hours and a pro in the same district took 128 for one night. They shoot them for skins and recently they have shot them for meat for human consumption here and export to Germany and the USA. Take a tip from me, Phil, and do what any hunter does; DON'T EAT ROO MEAT AS IT IS NOT TAKEN UNDER CLEAN CONDITIONS NOR THEREAFTER HANDLED CLEANLY TILL IT GETS TO THE EXPORT HOUSE. The pros would not eat it so why should anybody else?

A chap I know was retained to shoot wild horses—just destroy them—700 in all.

## LETTERS

### ROY DUNLAP'S "ANNUAL"

Dear Phil:

Time for my annual letter to the editor about everything in general that I either do or don't agree with in Precision Shooting. This is a re-write job; I wrote it October 29th; never finished.

First, I'm not with Dr. Hallberg (whom I know and respect) on the M1 and Perry business. Most of us, young or old, have found that the small rear aperture is poison at Perry. Fine on the nice bright relays, sudden death in a rain squall. Agreed on that width of front sight depends on eyes. The large service rear aperture may give you a poorly-defined picture, but it doesn't seem to hurt scores, and at long range actually raises them for many shooters. You have plenty of time to consciously center up, even in rapid fire, if you notice rear-sight in shooting. The web sling is a do or don't proposition. I love them, but, then, I found a couple of the older thin type which lock positively and adjust quickly. Most of the current heavy web ones are a little nervous about holding solidly. However, twenty-five years or so of leather slings previously used, with their constant stretching and slipping down, sort of discourage me with them too. I am surprised to learn about ball-powder damaged chambers in M1's, as no National Match ammo has been loaded with it to my knowledge, and anyone practicing with old ball should have his head examined. Still, Western has been loading ball ammunition on contract with ball powder, and I believe a lot of National Guard units have been issued it. The 1958 WCC ball is very accurate so they probably used it for pre-Perry practice.

On match conditioning the M1's; "putting it through its paces" to see what it'll do before thinking of match-conditioning is not smart—you're only wearing out the barrel uselessly. Practically any National Match or new Service M1 will shoot very well at first, then change zeros, then open up groups, and thoroughly confuse you. It may shoot lousy from first round, due solely to bedding and poor fit of gas-cylinder. If you get an M1, any type or condition, have it glass-bedded and match-conditioned by an armorer who knows how before putting a round through it. Incidentally, "armorer" and "gunsmith" are not the same necessarily—I know master armorers who couldn't work in any gun shop, and top gunsmiths who'd have to go to school to do ordinary service armorer work. I do M1's in fair numbers for the Signal Corps, some regular Air Force squads, Reserve, Air Guard and National Guard teams, who usually furnish new unfired National Match rifles. This gives them a full 5000 rounds of accuracy life (most units must turn in rifles for new ones after 5000 rounds, whether rifle is still shooting or not). I do quite a few jobs for civilian shooters and individuals in military service who own their own rifles, often rebarreling them and find that the work done is the most important factor—condition of rifle to start with doesn't have much to do with accuracy. Incidentally, a new Service rifle fixed up is practically always the equal of a National Match model. There is barrel variation in all types, of course, but this seems to have more effect on life than on accuracy. Some "loose" barrels shoot as good as tight ones, but not so long. Our rifle club was issued seven H & R new service M1's last year; I match-conditioned them and they are performing as well as any of our personal match jobs, and better than most!

Mr. Boenker's letter in September issue made some sense, but not completely. The .30 Newton ain't the same as a mag-

num case; it is rimless, and as big around as the magnum belt. I like the Newton, even though it broke the cartilage in my right shoulder in 1939. What a recoil! Of course I was loading to velocity beyond the .300 H&H. Vernor Gipson proved it with chronograph. I do not believe Winchester/Western will ever bring out a .30/338 case now that Norma came out with the .308 Magnum, which is just a little different in dimensions. The real fly in the ointment is that the belted case, **any belted case**, is such a lousy mess, to make, to size, to chamber for. Factory ammunition men know it is almost impossible to draw a belted case evenly, with uniform distribution of metal in walls near base. Putting a sharp-enough corner on the belt to head-space very precise gauges to check new space against has just about been given up. A few years ago a friend of mine made belted cases—in one box he found .023" variation in "headspace." I make bullguns:—headspace gauges are damn near worthless because Remington and Western cases are only similar, not close. In a rifle chambered to take Remington you can put in a Western cartridge, close the bolt, shake the rifle and listen to the rattle. A rifle chambered for Western, with proper tolerances, will seldom accept a Remington case at all. So I ask the customer what cases he wants to use and chamber accordingly. This belt variation is not important in hunting rifles, but for bullguns which are to be loaded to the very maximum I do consider it important since cases are usually reloaded twice or more. So, I like rimless cases, too.

Bore capacity exists, but it is an intangible, dependent on combination of powder, bullet and bore involved in each case used. 4320 and 4676 powders peak out fast—you can reach maximum velocity in most cases before reaching maximum pressure. 4895 pressures out—you get maximum pressure before velocity top in most calibers and rifles .30 caliber and smaller. In .30-06, 4350 with 180 grain bullet comes out even for most rifles—you get maximum velocity with maximum load, with maximum accuracy.

Noticed Mr. Ash's inquiry on remaining velocity of .30-06 180 grain match load at 1000 yards—believe it is 1200/1300 FPS. .300 Magnum loads chronographed at 1000 yards ran 1400 to 1500 FPS.

Regarding .308, now legal for NRA matches; can advise it will shoot. Built a heavy (12 lb.) M70 match rifle to test with, moved clip slots forward to get benefit of short bolt throw, etc. Shot 243 over National Match course, picking up sight settings as I went, with a 46 standing to start with. Used GI ammo; 2400 FPS stuff at short range, 2600 FPS at 600 yards. Both have built-in elevation flyers that cost a couple of points. Second time over course, using new experimental .30 target (8" 5-ring, 20" 4-ring), got 218 (242 on A and B targets) with 85 at 600, which would have been a 14V 98 on the B target, using Canadian service stuff (147 gr. boat-tail bullet) at short range, which has too tough a primer for my M70—lost a lot of points on elevation, though this ammunition is extremely accurate I believe. Short range groups were good, but not in middle! That 8 inch 5-ring doesn't allow wrong guesses on wind.

Bob Stinehour's article on mirage and doping brings to mind what happened here last spring. We had a 600 yard match at club, warm day, lot of mirage. One of the members, a geological engineer, brought out his transit and set it up over me, whom he was scoring. I'd shoot, and he'd say, "Well, the bull moved up about four inches and three to the left about then," etc. etc!

(Continued on Page Sixteen)



## COLT SHERIFF'S MODEL .45 1960 NEW MODEL ARMY .44

By Kent Bellah

Centennial Arms, 3318 W. Devon Ave., Chicago 45, Ill., sell two interesting new revolvers. The genuine Colt Sheriff's Model .45 is chambered for the best known of all big bore rounds, the .45 Colt, sometimes called .45 Long Colt. The 1960 New Model Army .44 is a beautiful replica of the famous 1860 Colt N. M. A. .44 percussion. It has select walnut stocks, varnished like originals, and parts interchange. Steel is high polished blue, with a handsome color case hardened frame. It's the nicest looking, best shooting replica I've ever fired. At \$89.95 I'd rather have it than a \$250 original for a shooter.

I've long felt that Colt's should revive some of their famous "snap & ball" guns of yesteryear. Centennial Arms simply beat Colt's to the draw. This one is stamped to avoid confusion with genuine relics. The fabricator is a great grand son of the Hanquet who signed a contract in the 1850's to make Colt guns in Belgium under license. If I say they are almost genuine, collectors will call me a dirty name, but I'll wager most of them will add this piece, that is charming in its own right, to their collection. I'm not a collector, but it's nice to have a quality soft coal burner to put zest in dull days.

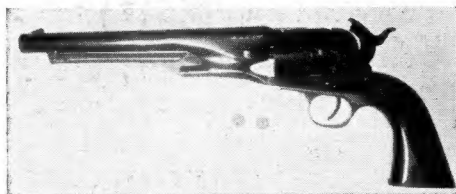
Reloading is cheaper and more simple than for any other type of big bore. If you never thought of it, handloading was old hat long before ammunition was invented! All you need is a mould, and a furnace or dip pot. No press, no sizer, no dies, no hells!

Lyman's .451 round ball mould is correct. At about 800 degrees is right for pure lead in the SAECO furnace, which is a bit hotter than generally used with an alloy. Unalloyed lead is best. Balls drop fast and easy from the blocks, at the rate of up to 300 per hour. Called a .44, the guns are actually .45 caliber, of course. They are for black powder only. A novice should remember that smokeless powder is generally black in color, but is NOT black powder! A grain or two of fast shotgun powder, such as Red Dot, or Unique, can be loaded next to the cap to reduce fouling, by reducing the charge a couple of grains.

FFg Black can be used. FFg Black is better, and the charge isn't critical. Some 26 to 31 grains works well. The gat has B. O. if fired indoors, being the residue from the 1-2-7 mix of sulphur, charcoal and saltpeter. In the old days it blended with smoke from coal oil lamps in honky-tonks while the piano played, and dust from trail herds, and train smoke in cattle towns. It made a "pair of sixes" beat four aces in poker games. It won the Wild West, bringing law and order to an untamed land. It made America great. No other nation exploited it so fully.

Black powder of superior quality made the name and fame of Du Pont known around the world. For more than a century the United States has led the entire world in the production and design of revolvers, sparked by Col. Sam Colt. No other nation ever used them so much or so well for practical, legal use. The pungent smell of black powder is stimulating on a frosty morning. Blend it with the smell of coffee and bacon on a camp fire, and Man! you are livin'!

Lacking a flask, a .44 Magnum case will dip a bit over 30 grains of FFg. You can use it as is, or trim to fit your needs. Better dip and weigh a few charges to see how your technique is working. The correct cap is Size 12. Best deal is to work up the best charge for your gun, just as with any powder. Oversize balls cause the chamber mouth to shave off a ring of lead. If you have this trouble, camber each chamber mouth lightly with a case deburring



Centennial New Model Army .44 is a replica of 1860 Colt Army. Collectors call all replicas dirty words, but shooters have fun with good ones. (Photo by Kent Bellah)

tool. Correct size balls do not give trouble.

When my two guns arrived, a clan call brought D. L. Cooper and R. B. Smith to help with testing. If you are a novice, let me explain that a "clan call" in this game is like an S. O. S. at sea. The fact that fellow hull fillers respond pronto is a side benefit in this handloading game. Millionaires can't buy the lasting friendship and companionship that we enjoy.

We were surprised at how well the fascinating Centennial Army shot. The big balls drill great, gaping holes in tin cans, making them jump like they were alive. Groups wad up on paper. Cooper decided the replica would appeal to his audience at demonstrations. However, the round ball might be difficult to use in some stunts, such as splitting a bullet on an axe blade to break a target on both sides of the blade. Even wadcutter .38's must hit nearly dead center for this stunt.

Loading is easy. You pour charges in the chamber, drop a ball on the mouth, and seat it with the attached rammer. Cap the nipples and you are rodded up. Lube isn't necessary, but a dab of cup grease or some other lube over the loaded balls reduces fouling. In the old "daze" when a rammer was broken or missing, it was possible to seat balls by banging the butt against a solid object. Not recommended, of course, but the trick got some old timers out of a jam. The old guns gave a good deal of trouble of various kinds. New ones are better.



Colt Sheriff's Model .45 in Bellah's battery is versatile with bullets or shot, and packs a punch for a compact gun. Centennial Arms made history by having a short run of this rare model made by Colt's. Not sold by Colt dealers. (Photo by Kent Bellah)

Colt's 3" Sheriff's Model takes any .45 Colt factory or reload safe in any Colt. The short tube shoots much better than most people think. The big blaster is small enough to go in your trouser pocket, giving it the title "The World's Biggest Pocket Pistol." It's quite practical, lethal as it looks, and vicious-looking. Recoil is not bad at all. The punch is at least three times as effective as the snub-nose .38's.

It's on a special Colt S. A. A. frame, without an ejector. You hardly need one. Most fired shells fall out of the chambers. Any sticky ones can be punched out with the base pin, a pencil, or even a cigarette. This special limited run is numbered in a separate series, starting with 1 SM. They are not sold by Colt dealers, but direct from

Centennial at \$139.95, with genuine walnut stocks. There is no extra charge for consecutive serial numbers on pairs. This is the most rare model of genuine Colt's, revived for this short run, using steel suitable for heavy smokeless loads. Original 40 grain Black loads are OK. Modern cases work well with 37 grains FFg Black and most pills.

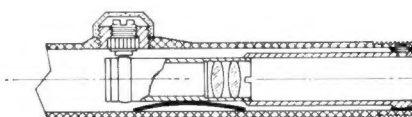
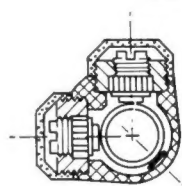
More loads have been developed for this caliber than any other larger than .38. The cartridge has inherent accuracy. Many groups were made many years ago that were better than modern .38 service ammo.

You can use the N. M. A. .451" round balls for a light gallery load. Try 3 to 3.5 grains Bullseye. Seat balls nearly flush with the case mouth, and crimp the case. Balls weigh around 140 grains. They shoot a bit low, but I use the same sight picture as for 100 yards with full charge ammo, and they hit center at 15 yards.

Forster-Appelt, best known for their excellent Forster Precision Case Trimmer, now have a complete kit for loading wax bullets, using primed cases without powder. They are good for training or fast draw work. The wax is excellent, a special compound, available separately.

An excellent defense load, perhaps the best, is a 190 grain hollow point soft lead pill backed with 11.4 grains Unique. Recoil is mild, bullet expansion excellent. Our tests were made with jacketed pills swaged in Bahler dies. We have not yet worked up loads for C-H Swag-O-Matic half-jacketed bullets. Bahler is the only supplier I know for .45 jackets. Division Lead Co. "Swag-O-Matic" lead wire is excellent, in 44-45 caliber. Speer also sells 44-45 wire.

Shot loads are dandy for small game to 15 yards, and for safe practice on aerial targets in settled areas. Use 6 to 7 grains Bullseye. Seat a thin card wad and 1/4" felt wad with a wooden dowel, using about 10 pounds pressure. Fill the case nearly full of No. 8 shot, and insert a .45 gas check, skirt down. Crimp heavily. You can buy or make a wad cutter, about .451" diameter. Strange as it seems, my 3" tube handles shot much better than my long barrel .45 without alteration. You never know what a gun will do until you try it! These two guns, and the new Colt No. 4 Deringer, have a charm that recalls the days of yesteryear, when black powder smoke hung like a cloud over the Old West. They are fine fun guns today.



### LYMAN SCOPE IMPROVEMENT

A new feature of the LYMAN "ALL-AMERICAN" line of hunting scopes is the "Perma-Center"; a three-point middle-cell adjustment-suspension system that keeps reticule crosswires permanently centered optically, even though elevation and windage adjustment screws are moved to their limits.

It is stated that the "heart" of the new adjustment-suspension system is "a precision mounting against Swedish Spring-steel balance leaf" to give long-time accuracy, ruggedness and dependability.





### HANDI-BOXES FOR THE HANDLOADER

HANDI-BOXES are rugged little boxes or trays molded from a strong plastic material in dark green color. They are 3½ inches long, 3 inches wide and 1¾ inches deep and nest securely for storage stacking. The "open bin" construction permits ready identification of contents without disturbing the stack. They provide convenient, space-saving storage for the many small items, tools, components, etc., that the hand-loader and gun tinkerer accumulates and uses frequently. The nesting feature permits a box to be readily removed from the stack when its contents are wanted for use on the bench.

While suggested uses are storage of primers, bullets, cases, dies, etc.; I personally like to store most of those items in closed containers for as much dust protection as possible, especially dies and bullets, but I find the boxes very convenient and practical for holding loose bullets and primers for handy accessibility while reloading. They are also mighty handy receptacles when sorting bullets into different lots by weighing. I suspect I'll find many other uses for the boxes. I like them.

Since they are relatively inexpensive (\$1.00 for sets of three boxes, postpaid from the CONTAINER DEVELOPMENT CORPORATION, Box 119, Watertown, Wisconsin) it seems sensible to make use of them for all of "getting along" with less convenient, make-shift containers.

PHT

### AVTRON BALLISTICS COUNTER-CHRONOGRAPH

(The following information is supplied by the manufacturer; Avtron Manufacturing, Inc., 10409 Meech Avenue, Cleveland 5, Ohio.—Ed.)

Avtron Manufacturing, Inc., announces a new ballistics counter-chronograph specially developed for the advanced amateur, gun club, and professional laboratory that desires an extremely accurate, yet low cost counter-chronograph.

Avtron is a well known producer of special instrumentation and test equipment utilized by the aircraft and missile industry, and the Avtron counter-chronograph utilizes techniques developed by Avtron engineers, and which in the past, have been applied to precise timing and counting instrumentation work. Inasmuch as several of the Avtron project engineers are avid shooters, having access to a big bore range and doing their own handloading, it was natural that their

skills and techniques should be applied to the development of a counter-chronograph.

In the Avtron counter-chronograph, a crystal controlled time standard creates electrical pulses at a frequency of 100,000 cycles per second. As a projectile breaks the "start" screen, these pulses are applied to the decade counters, and the pulses are thereby accurately displaying the time of "stop" screen. The decade counter display, on the base of the chronograph, therefore counts the number of pulses that elapse between the breaking of the two screens, thereby accurately displaying the time of flight of the projectile as it breaks the two screens.



By referring to tables included with the instruction manual, the number shown on the counters is directly converted into foot per second readings of the speed of the projectile between the two screens. Two screen holders, as well as a supply of the expendable screens are included with each chronograph.

Recognizing that many outdoor ranges may not necessarily have a source of 110 volt, 60 cycle, AC available, provisions were built into the Avtron Model T333 Chronograph to allow operation from any standard 12-volt automobile battery. Since the accuracy of the unit depends on the crystal controlled time frequency, and not on the frequency of the power supply, the same degree of accuracy is obtained on battery power as on standard line current.

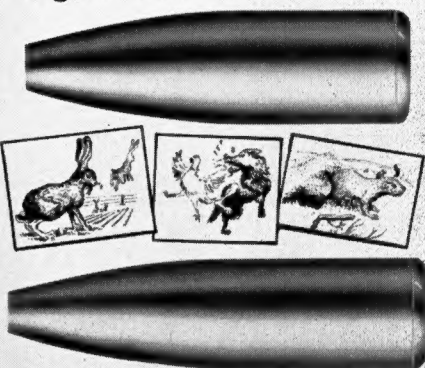
The expendable screens are approximately 3 by 5 inches, and are transparent, in order that it is easy to see through them to sight on a proper backstop. In addition, the size of the screens was chosen to

avoid the necessity of extremely careful alignment. A set of cables for both screen connections, and power connections are furnished with each chronograph.

Upon completion of the development of the chronograph, an extensive field test program was conducted, which included range testing under various conditions, comparison by ballistic laboratories with existing velocity measuring equipment, and environmental testing that included low temperature and high temperature tests. The result is a chronograph, sufficiently economical to appeal to advanced amateurs, and also professional laboratories, that is extremely portable, light-weight, can be operated by non-technical personnel, but still maintaining laboratory accuracy.

The velocity range is 250 to 5,000 Feet/Sec. Accuracy is plus or minus .05% (can be read to 1/100 of a millisecond). Size is 15" wide by 9" by 10" deep. Weight is 20 pounds. The price of the chronograph is \$345.00.

### 85 grain 6.5 mm HOLLOW POINT



### 100 grain 6.5 mm HOLLOW POINT

### NEW SIERRA 6.5 BULLETS

SIERRA BULLETS now offer two new 6.5 m/m bullets. The new 100 grain bullet is manufactured especially for the .264 Winchester and other high velocity cartridges (3600 fps approx.). The lighter 85 grain bullet is designed for medium velocity cartridges (3000 fps approx.) such as the Swedish 6.5 x 55 Mauser and the Norwegian 6.5 Krag.

### The Information Bench

The Information Bench service is available to all Precision SHOOTING readers. With your questions, send a stamped, self addressed return envelope for a reply. Selected questions and answers, covering as wide a variety of interests as possible, will be published in these columns. Address your questions to the following people.

Rifles, all types, accessorise, handloading, components and shooting methods:—**R. W. Lathrop, The Information Bench, 3207-148th Ave. S. E., Bellevue, Washington.**  
Sporting handguns and loading—**Kent Bellah, Saint Jo, Texas.**

**Question:** I have a nice, tight Winchester M92 in 32/20 that is converted to .357 Magnum. Can I safely use 16 grains of 2400 with 136 grain half-jacketed bullets I'm swaging in a C-2 Swag-O-Matic press? Earl's Sport Shop, Sparta, Wis.

**Answer:** I'm indeed sorry we have not had time to give C-H bullets a careful test in a Winchester M92 rifle converted to .357 Magnum. Just as soon as time permits I'll have some top recommended loads that have proved to be safe and good in more than one rifle.

I have been shooting 15 grains of 2400 behind a 127 grain C-H semi-wadcutter bullet, using CCI Small Pistol primers. This has shot well in the M92 rifle and Smith & Wesson revolver. I do not think it is a top  
(Continued on Page Sixteen)

# National Bench Rest Shooters Association, Inc.

## NBRSA OFFICERS AND DIRECTORS FOR 1961

### EASTERN REGION

Robert W. Hart (President)  
300 West Fourth St.  
Nescopeck, Pa.  
Paul O. Gottschall (Deputy)  
R. D. 4  
Salern, Ohio  
Brunon Boroszewski (Deputy)  
Chestnut Ridge Rd.  
Orchard Park, New York

### MID-CONTINENT REGION

R. G. Berry (Vice President)  
Pawnee, Oklahoma

### MISSISSIPPI VALLEY REGION

Alfred W. Walter  
1925 Raft Dr., Hanley Hills  
St. Louis 33, Missouri

### GULF COAST REGION

Robert W. Smith  
6806 Lake Shore Drive  
Dallas 14, Texas

### NORTH CENTRAL REGION

Walt C. Siewert  
Box 749  
Custer, South Dakota

### NORTHWEST REGION

Dr. Rod Janson  
606 West Galer  
Seattle 99, Washington

### SOUTHWEST REGION

John B. Sweany  
187-A Silverado Trail  
Calistoga, California

#### Secretary-Treasurer

Bernice E. McMullen  
603 West Line St.  
Minerva, Ohio

### NBRSA MEMBERSHIP DUES:

Individual annual dues \$5.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) \$2.50. Life membership, \$75.00. Annual club affiliation fee \$10.00.

### EASTERN REGION WINTER MEETING

Thirty-eight members attended the annual Eastern Region Winter Planning Meeting at Elmira, New York, January 25 and 26. Seven clubs were represented, including a new club located in the Philadelphia, Pa., area, which will conduct registered matches in 1961.

A discussion was held concerning the best time to hold the National Varmint Rifle Championships and the opinion was that at least one month should separate the two National Championships.

The National Championship Matches for unrestricted bench rest rifles will be conducted by the Pine Tree Rifle Club at Johnstown, New York, on August 31 and September 1st, 2nd and 3rd.

Stationary backers, in addition to the required moving backers, will be used for the unrestricted rifle National Championships at Johnstown. Members at the meeting approved the proposal that the expense for installing the stationary backers should be borne by the Eastern Region and paid from the regional treasury.

Cross-fires were discussed for considerable time and a recommendation to the NBRSA directors was made in a motion that, when stationary backers are in use to identify cross-fires, the penalty for a cross-fire be reduced from disqualification to an increase of 50% in the measurement of the offender's target in the match that the cross-fire occurred. The competitor whose

target has been fired upon will, of course, be relieved of the cross-fired shot.

The problem of rapid firing and moving backers was discussed at length. No solution was reached but everyone is aware of the problem and an answer is being sought.

The National Varmint Rifle Championships for 1961 will be conducted by the Reed's Run Rifle Range at Augusta, Ohio (some 20 odd miles southeast of Canton, Ohio, in the northeastern part of the state), on July 21st, 22nd and 23rd.

The Sporter Rifle Class was discussed and it was the opinion of members at this meeting that more experimenting and testing must be done before the NBRSA directors should adopt official targets and set up national courses of fire for this class.

Region treasurer Marion Reece presented his financial report. Auditors were appointed to audit the books. The audit was made Saturday evening and the committee reported at the Sunday meeting that the books had been found as reported and correct. A motion was made and carried that a regional treasurer be elected for a term of two years. Then Marion Reece was unanimously re-elected for the two year term.

A report on the status of Precision Shooting magazine was made by Crawford Hollidge, President of Precision Shooting, Inc., the publishers.

The match scheduling committee set up a schedule of matches in the region for the 1961 season and this was presented to the members at the Sunday morning meeting. (The firm schedule will be published in the March magazine.)

The CHARLES HART MEMORIAL TROPHY was won in 1960 by the Inter-State Team, comprised of M. J. Toutant, captain, Earl Thompson, Omar Rinehart, M. Shelt and Paul Gottschall. The winning aggregate score was 491. Deputy Director Brunon Boroszewski made the trophy presentation.

(This report prepared from information supplied by Eastern Region Director Robert Hart. PHT)

### 1961 BENCH REST MATCHES GULF COAST REGION

San Angelo, Texas: May 27 and 28; Texas State Bench Rest Championship (unrestricted bench rest rifles); (Mrs.) Marie Spencer, Box 1243, San Angelo, Texas.

San Angelo, Texas: August 12 and 13; Texas State Varmint and Sporter Rifle Bench Rest Championships; (Mrs.) Marie Spencer, Box 1243, San Angelo, Texas.

#### MID-CONTINENT REGION

Wichita, Kansas: April 8, May 13, July 1-2, and Sept. 30; Wichita Bench Rest Rifle Club, Larry Engelbrecht, Sec'y, 122 Gow, Wichita 3, Kansas.

Kansas City, Kansas: June 3, Aug. 5, and Oct. 21; Mill Creek Rifle Club, Inc., L. F. Carden, Sec'y, 2211 North 44th St., Kansas City 4, Kansas.

Tulsa, Oklahoma: Apr. 16, May 21, June 17, July 15, Aug. 19, Sept. 16, and Oct. 21; Tulsa Bench Rest Rifle Club, Inc., E. A. Anderson, Sec'y, 3604 So. Toledo, Tulsa, Oklahoma.

### NEW RULE BOOKS

NBRSA secretary Bernice McMullen has advised that new rule books will be going to the printer very soon and that an announcement will be made when they are ready for distribution.

She has also advised that the burglars who broke into the Reed's Run Rifle Range club house have been apprehended and are bound over to the Grand Jury.

The schedule for Eastern Region bench rest matches in 1961 will be published in the March magazine.

### THE PRESIDENT'S CORNER

As I promised in the January issue, this month I will discuss rules and rule changes.

A letter has been received concerning the Heavy Varmint rule on rifle weight and specification. The comment in this letter was that if a barrel was made to the size specified, a certain action used, a stock to the limit in size, and a heavy scope, it would weigh over 15 pounds. When this rule was made it was not the intention of the directors that any rifle had to be made to the maximum dimensions specified. The specifications in the rule are maximum size and weight allowed and a rifle must be within these limits, but may be as much under the maximums as the individual shooter may desire. It is the individual shooter's privilege to balance weight in the various parts of his gun as long as the total weight does not exceed the rule limits. To increase the weight in this class would be crowding the heavy rifle field.

And now in regards to the rule changes adopted at the Directors' meeting in Tulsa, Oklahoma, in 1960.

Heavy Varmint Rifle specifications: The change on barrel size was made for the convenience of gunsmiths and to permit re-chambering of a barrel without running into the taper on the barrel. The permitting of flats or beavertails is to allow the man who has a store-bought rifle to add to the stock in order that he may be on a par with the custom made stock, without the added expense of such a stock.

The course of fire for the National Championship Match was changed from 100 record shots to 200 record shots, as follows: First day; five 10-shot matches at 100 yards and an aggregate winner for the day. Second day; five 10-shot matches at 100 yards and an aggregate winner for the day. An aggregate for the two day's shooting with the winner to be the 100 yard national champion.

Third day; five 10-shot matches at 200 yards and an aggregate winner for the day. Fourth day; five 10-shot matches at 200 yards and an aggregate winner for the day. An aggregate for the two days shooting at 200 yards to be the 200 yard national champion. A grand aggregate for the four days shooting with the winner to be declared the National Bench Rest Rifle Champion.

This program provides seven (7) places of recognition to be won. Under our past program there were only three (3) places to be won. Our equipment today will stand the extra shooting and other sports have a good sized program for a National Championship. A few illustrations: Golf plays 72 holes; baseball, 3 to 7 games; the smallbore rifle championship requires 640 record shots, and many others could be mentioned. The increase in amount of shooting should increase the interest in our National Match. Last year I believe the average travel to attend the National Match would be 1000 miles each way. To travel 2000 miles to shoot 100 shots averages about 20 miles driving for each shot fired.

The National Matches in the past have been for either three or four days, so the four day program is not much of a change, except that all the days will be devoted to the championship competition instead of having "warm-up" matches for one or two days. If a shooter may be able to attend on only two days, he may shoot for the 100 yard championship on the first two days, or for the 200 yard championship on the last two days.

I also believe that a 200 shot championship course will have less heart-break for



many shooters for the following reason: In a 100 shot championship or in our National Course of fire, if a person loses one shot (that can be caused by many things) or may have to accept a cross-fire, he is "dead" in the aggregate and a good many places down in the ranking. In a 200 shot National Championship, by good shooting it may be possible to have one bad break and still end up in fair position. This should make the match more interesting.

Our National Course of fire for all other matches has not been changed.

I know that there is no rule that pleases every one, but I sincerely hope that all will accept these changes in good grace and give them a fair trial.

**PROBLEMS AHEAD:** As many of you active competitive shooters know, we have competitors who can complete their 10 record shots in 2 minutes. This poses a problem with our backers for it is rarely that the backer will clearly show 10 shots at 100 yards when firing is done in so rapid a fashion, and many times it is difficult to count 10 shots on a 200 yard backer. We can not say to a shooter, "you dare not shoot that fast," nor can credit be given for the shooting he is doing if the proper number of shots can not be counted on the backer. I saw a probable new aggregate record lost last season for this very reason. This is a bad situation. The answer does not appear to be an easy one. The solution to this problem is every shooting member's concern and your ideas and suggestions are requested.

Until March,

Bob (Robert W. Hart)

## ARIZONA BENCH REST MATCH

On Sunday morning, January 8th, Mrs. Lathrop and I drove to Casa Grande for the second match of the season of the Arizona Bench Rest Ass'n. The day was bright and clear but a little colder than usual and very, very windy. In fact the weather bureau rated the state at 35 miles per hour and in some places it was much worse than that. The club decided to shoot the light rifles first, hoping for better conditions later; but they never came and the wind got worse as the day progressed.

Eleven shooters took part but not all shot all the matches and some were disqualified by being off the regulation target. I was fortunate enough this time to get my name on the new trophy for the 13½ pound class. It takes three wins of a trophy to be able to keep it.

Brenner, Pat McMillan, Minucci, Ruch and Peters shot the standard .222 and Lathrop, Ruth McMillan and Williams shot the .222 Magnum, while Wilkinson and Schneider shot the Wasp.

After the match a short meeting and election was held. Mrs. Ruth McMillan, 4908 East Indianola, Phoenix, Ariz., was re-elected secretary and treasurer, and Jack Williams was re-elected range officer. It was decided to offer a new Sako barrelled action as the trophy prize in the unlimited class. It takes three wins to own it.

Those who ranked high in the aggregates were: For "Gravel Pit" (10½ Lb.) rifles; aggregate of four 5-shot matches:—Pat McMillan .57" and trophy winner with .38" group; Ruth McMillan .75; Jack Williams .75; and Frank Minucci .77.

For 13½ lb. rifles:—L. Brenner .52" for five 5-shot matches; Pat McMillan .604; Jack Williams .606; R. W. Lathrop .676 and trophy match winner.

Unlimited rifles, four 10-shot matches:—Ed Ruch 1.04"; Jack Williams 1.06"; Greg Schneider 1.22"; and Pat McMillan 1.22".

R. W. Lathrop

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### OBSERVATIONS AND EXPERIENCES

By A. H. Angerman

### ATTENDANCE AT REGISTERED BENCH REST MATCHES

Many opinions have been offered on whether or not bench rest shooters are growing or declining in number. If there is any significant trend one way or the other, it ought to show up in the attendance records. I paged through all issues of Precision Shooting starting with the January 1955 number (1955 was for Shooters News, ed.) and added up the number of participants in all shoots reported. The table below suggests that bench rest shooting is on somewhat of a plateau at least with respect to the number of shooters that actually attend competitive matches. No doubt there are at least as many more who "tinker" at it, but who have not as yet entered into active competition.

1955	813
1956	1072
1957	1116
1958	1060
1959	1014
1960	1056

(Editor's comment: The figures listed are quite evidently the total number of "entries" in all the shoots reported, and considerably exceeds the number of individual shooters who participated. A quite considerable number of individuals participate in several shoots during a season, some as many as ten or a dozen, others participate in two or three shoots, while others may participate in only one shoot during a season. A reasonable "guesstimate" would be that the individuals participating in registered shoots in any of the years would not exceed 40% of the figures listed, and would be probably less than that.)

### OFFICIAL RECORDS

How fast are we breaking bench rest records, and by how much? It was interesting to make a table of the official 100 and 200 yard records existing at the end

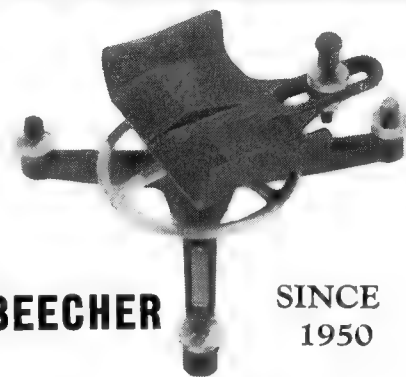
GROUP AND AGGREGATE RECORDS														
Year	5 at 100	10 at 100	5 at 200	10 at 200	5-5's at 100	5-5's at 200	5-5's at 100-200	5-10's at 100	5-10's at 200	NMC Agg.				
1950	.1057	.3720	.3896	.7580	—	—	—	—	—	—				
1951	—	—	—	—	—	—	—	—	—	—				
1952	—	.3268	—	.6378	—	—	—	—	—	—				
1953	—	.2677	—	—	—	—	—	—	—	—				
1954	—	.2402	.3032	.5276	—	.3124	—	.3570	.4810	.4520				
1955	—	.2126	—	—	—	—	—	.3430	.4100	.4091				
1956	.1024	.1969	.2756	.4016	.2758	—	.4399	.3142	.3855	.3954				
1957	.0758	—	—	—	.2154	.2778	.2873	.3105	—	.3729				
1958	.0630	—	—	—	.1973	—	—	—	—	—				
1959	—	—	.2383	.3330	—	—	—	.2903	.3684	—				
1960	—	—	—	—	—	.2602	—	.2758	—	—				

of each year over the period 1950. Here's how it looks:

All of the single group records (first four columns) are in inches, while all of the aggregates (last six columns) are in minute of angle. 1960 may have some additional new records which are not official as yet. Note that at least over the last four or five years, most of the group records have been broken by only .01 to .02 inch, and by only .01 to .02 M. O. A. in the case of the aggregates.

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### EFFECT OF RIFLE CANT ON PRECISION

Several years ago I shot several 5-shot groups at 100 yards with my .222 Rem. bench rifle with 2" Unertl scope (centerline 1.5" above centerline of bore) in normal position. Impact was adjusted to exactly 12 o'clock, 3.30" high. I then canted (tilted) the rifle to the left by 45 degrees and fired several groups. Impact shifted 4.20" to the left and only 1.50" high. Laying the rifle on its left side (90 degree cant) gave an impact 5.85" to the left and 3.25" low. I repeated this by canting the rifle 45 and 90 degrees to the right. The groups came in the same relative positions but of course on the right rather than left side of the constant aiming point. I used

a conventional 100 yard smallbore target for this experiment. Plotting these data on a graph, and applying some elementary analytical geometry we concluded that one degree of cant either to the right or left of vertical will shift the impact .093" horizontally and .002" downward. Most bench rifles, however, have a wide, flat forearm with some sort of guide to minimize cant, and a one degree "tilt" from normal would be quite noticeable. But we're trying for the ultimate in precision, and if the forearm

(Continued on Page Twelve)

## Observations and Experiences

(Continued from Page Eleven)

is say 3" wide, all that we need is a .005" speck of dirt getting under one side or the other during the firing of a group. This speck of dirt will give rise to only one tenth degree of cant which we will not notice, and which will give a group enlargement of about .01"—fairly significant these days when matches are won or lost by less than this.

### RELATIVE SIZE OF 100 AND 200 YARD GROUPS

For the last few years I have been keeping records of the size of 5 and 10 shot groups fired in competition at 100 and 200 yards (all on M. O. A. basis). Comparison of hundreds of groups of each kind brings out a "magic figure" of  $\frac{3}{4}$ . For example, 5 shot groups at 100 yards are on the average  $\frac{3}{4}$  as big as 10 shot groups. 5 shot groups at 200 yards are  $\frac{3}{4}$  as big as 10 shot groups. 5 shot groups at 100 are  $\frac{3}{4}$  as big as 5 shot groups at 200. 10 shot groups at 100 are  $\frac{3}{4}$  as big as 10 shot groups at 200. The figure  $\frac{3}{4}$  will not necessarily apply on only one or two groups—we're talking here about averages of many groups. Maybe some bench shooting physicist or mathematician can advise us why we get this relatively constant relationship between group size and distance.

### GROUP SIZE VARIABILITY

The performance of a given primer-powder-bullet combination can not be determined by shooting two or three five-shot groups. The normal variability in group size from the same combination under good conditions makes it difficult to determine with certainty that carefully made bullet A, for example, is slightly better or worse than carefully made bullet B. Statisticians tell me that 20 groups of each are necessary to positively decide if there is a significant difference. Last year I fired 20 five shot groups with bullets labeled A and 20 groups with bullets labeled B. The same primers and powder load were used for each. Bullet A gave an average deviation in group size of plus or minus .047", while bullet B gave an average deviation of plus or minus .053". In other words if you go out to the range and get an average of 0.200" for say only two or three 5 shot groups with bullet x and an average of 0.250" for the same number of groups with bullet y, it doesn't necessarily follow that x is better than y. The plus or minus .050" normal variation has to be taken into consideration, and if more groups of each were fired the averages might come out the same. We see shooters at the matches "testing" bullets in a surprisingly short period of time or similarly "testing" loads with the same bullets, and frankly wonder how valid the conclusions were that they drew. Only when there is a distinct difference in the averages of a large number of groups can one say that a bullet or load is better.

### EFFECT OF NECK TENSION ON PRECISION

Did quite a bit of experimenting with extremes along this line. I first reloaded a bunch of cases without resizing the necks. This was accomplished by wrapping a thin paper shim around the bullet to hold it in place, thereby getting no tension on the bullet at all. After firing a sufficient number of groups with no bullet tension, I renecked the same cases with a tight neck die, in fact had to beat the hand seating die with a mallet to seat the bullets to proper depth. There was no significant difference in average group size. This result is somewhat in line with earlier reports that a loaded round with a split neck (low tension) shoots right into the same group made with normally renecked cases. Hand seat some bullets on a bathroom scale sometime and you'll

find that not too many pounds of push are needed to seat the bullet—provided of course you have the proper size reneck die. This small amount of push is equal to the push required to release the bullet, and seems insignificant compared to the tons of pressure per square inch we get when the round is fired. Thus, theoretically at least, a small variation in neck tension should have little effect on precision. Too much tension, however, can actually reduce bullet diameter or distort the bullet shape which causes an unbalance and therefore possible loss in precision.

### THROAT EROSION

Here's how the throat on my .222 Rem. Hart barrel is eroding in case anyone is interested in this subject.

Rounds fired	Throat erosion
0	.000"
500	.008"
3800	.051"
4438	.067"
5600	.095"

Groups are as good now as they were earlier. Don't know when this barrel will "give up." I know one guy who can no longer come close to the lands with his bullets seated out as far as he can get them, yet his gun is still taking plenty of bench rest matches.

### EFFECT OF CASE WEIGHT UNIFORMITY

I'm beginning to believe that uniformity of case weight has something to do with precision. No doubt other shooters have known this long ago. In every test I've made comparing cases that weighed within 0.3 grain with cases that varied by ten times this (3.0 grains) there was a difference of .055" in the average size of my 5 shot groups. The results were repeatedly in favor of the more uniform weight cases.

### CONCENTRICITY OF BULLET AND CASE

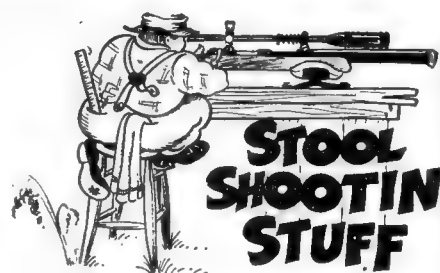
An easy way to check for concentricity of bullet and case is to chuck the round in a Forster outside neck turning tool. The cutter pilot happens to have a little hole drilled precisely in its center. Move the pilot up slowly until the tip of the bullet rests lightly in the drill hole. Then back off on the chuck tension slightly so that the case and bullet can be rotated with the fingers. The eye will now be able to detect neck, bullet or case misalignment.

### HOW GOOD ARE THE POWDER MEASURES?

Two popular measures were tested with Western Ball C and with IMR 4198. Ten to fifteen thrown charges were weighed on an analytical balance for each test.

	Measure A		
	Max	Min	Spread
Ball C—Test 1	25.48gr	25.31gr	0.17gr
Ball C—Test 2	26.67	26.54	0.13
4198—Test 1	24.78	24.49	0.29
4198—Test 2	24.61	24.45	0.16
	Measure B		
	Max	Min	Spread
Ball C—Test 1	25.09	24.93	0.16
Ball C—Test 2	25.56	25.36	0.20
4198—Test 1	21.34	21.12	0.22
4198—Test 2	21.23	21.02	0.21

The data do not show a clear difference in precision between the two measures or the two powders tested. In general the heaviest and lightest charges differed by about 0.2 grain. Recently I compared the average size of ten 5 shot groups using an exact load of 20.50 grains versus ten 5 shot groups in which the powder was deliberately allowed to vary from 20.40 to 20.60 grains. There was no significant difference. Despite this I like to use weighed, rather than measure thrown charges, for it gives me some comfort in knowing that I can't blame a flyer on a variable powder load.



Dear Phil:

Here we are on good old Cape Cod with weather more like what I would expect on the way home from the Elmira Winter Meeting. It seems to me that the moving ahead of that meeting two weeks must mean that the weather man is working by his. Snow or no snow, Merrie and I are going to attempt to make the meeting in a few days; however, if the elements are so far against us as to bring another wopping storm upon the top of this one the day that I am to leave, I'll probably cancel because it is just getting too much of a chore and too hazardous to travel nearly 700 miles to chin for a day and a half, even with guys that I enjoy very much.

There is a lot to be taken up at such a meeting and from those meetings, there have been some years that have brought forth some fine developments in the bench-rest game.

The setting up of the Summer schedule has been worked out to a pretty routine system and although everybody doesn't get exactly what they want for their shooting dates, there is both little complaint or reason to complain and I have always noted with pleasure the fraternal attitude between the different shooting clubs when they are setting up the summer program.

It won't be too early to give serious thought as to how we are going to proceed to make the National Shoot at Johnstown the best shoot ever. It has often been said that it is easy enough to "talk a good game" but to play a good one takes a lot of planning and team work, some good coaching and the determination by the players to stand out as good sports and competitors. We are very fond of this game and I can think of no other where such a large majority of the players are individualists. They are self assured and have been accustomed through most of their life to overcoming obstacles of one kind or another through their own efforts, mostly, after arriving at answers that they extract from careful thinking and a proper analysis of mistakes and successes which they and those with whom they come in contact have made.

It has been my observation that there are two types of fellows who do not do well in the competitive shooting game. The first is the fellow who thinks that the purchase price of a gun in the higher brackets will buy with it a series of winning targets. At the opposite end of the line is the chap who thinks that almost all guns are over priced and that the success which he attains in matches will come because he is a more capable shooter. I readily agree that a very expert shooter can get a lot out of a mediocre weapon but this shooting game that we are in has been developed to such a stage that there are a lot of very capable shooters and most of them are shooting excellent guns and are using techniques and accessories that are the result of a very selective effort which has long ago rejected the impractical or uncertain.

To those who have been in the game, the answers are well known. To those who are in the game and not doing well, there are two thoughts that I would pre-



sent. Number one is that if you are a shooter who thoroughly and sincerely enjoys the game, keep on doing just what you are doing now and avoid getting in a rat race that will keep you disturbed or thwarted through many days and nights that would otherwise be mellow and restful. There is nothing quite so important as being happy with what you are doing. As time goes on, a little bit of good luck and improvement in equipment and technique will certainly rub off from those fellows around you as you play the game with them.

If you would improve your shooting, first to the middle class and then to the upper group, search out and observe carefully, the equipment and technique of those who have shot well over a period of years. Solicit their advice and note carefully some of the things which they will gladly tell you. Write them down in your note book later, and subsequently re-read and think about them until you thoroughly understand them. Listen to the conversations that go on at the bull sessions at the loading benches. It is probably true that what is one man's meat is another man's poison but you should carefully analyze the conversations and separate the wheat from the chaff. Avoid going off on tangents which seem to be the path to quick success. They will lead you far in the wrong direction. On the other hand, there may be just one or two little details that you may learn to correct in yourself, and thus bring you considerably higher up in the shooting list.

I have noted that almost all endeavors in life do not improve by a constant incline and shooting progress is no exception. The improvement comes in inclines which reach a flattening step, and then there is another break-through in one technique or another that brings us to another higher level. The platform level is apt to stay an indefinite period unless we recognize that a new break through is required to bring us to a higher level of proficiency. Some people are more alert than others in recognizing that they have reached a step where new break throughs are required, and they quickly search for such means to elevate their position.

We frequently meet shooters, old or experienced in other shooting games and they almost invariably start at a higher level but sometimes they progress little beyond that point because they think that their age and previous experience should win their battle for them. Such is not likely to be the case because a fresh outlook on the benchrest shooting game is what brought it back to life again and indeed is the very life of the game itself. Who is there that does not recall how vividly these new outlooks have brightened the game. I know of few other groups of people who strive so hard to beat mediocrity of performance. We have not reduced our game to a science yet and I hope we shall never do so, although I hope we always keep its scientific angle in proper proportion to the sport. We have had lots of fun throughout the years but just look back and view some of the new practices and features which we brought into the game. One of the earliest was the demands for better barrels and we had to have them larger in diameter to absorb vibration and heat better, and carefully selected so that the uniformity and workmanship throughout the bore was higher than average standard to be acceptable. The quality of the barrel fitting to the action and of chambering work needed improvement. Lock time, triggers and actions needed improvement and after many thousands of dollars invested in other type actions, we seemed to have conclusively proved that the bolt action was the only one that could be depended upon to give the

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accuracy demanded.

It matters not how nostalgic we may be about other actions, they have not yet been able to make and hold the grade but this is not to say that some day a better action may not come along to supersede the bolt type.

We see few guns these days in the winning classes that are not rifled by the button process. The old type rifle barrel has won many matches and will win many more but it is destined to be the exception to the rule. Whereas few barrels of the old method are acceptable, almost all of the buttoned jobs by makers who are catering to the precisionists are delivered to shooters at a very high standard. This is not to say that the makers do not have their troubles but, fortunately for we shooters, they have the moral character to reject into their scrap pile the duds and not pass them on to us.

Not only did we need better methods, but we needed better steels. The stainless barrels have seemed to prove their worth and we are deeply indebted to one maker, Clyde Hart, for having experimented through type after type of stainless steel until he can now give us the best that the market affords for our purpose and still be able to make them without the cost being excessive.

Some of us look back to enjoyable shoots where records were being made by men and guns far different from those of today. Just visualize some of those old liberated Mauser stocks, some of them sawed off in front of the magazine well, others enlarged and reinforced by metal, plates or panels of wood often combined with plastic wood or a homemade combination of sawdust and glue. Following that, there was a stage of rough plank-like contraptions almost kinfolk to railroad ties. The finish on the barrel or shaping or finish on the stock was considered as non-essential. The blood of our forebears runs thick in our veins, and so as time went on, we spent more effort in improving the appearance of our guns and today, as one looks over the line, there are some mighty nice looking pieces whose shooting quality has not been impaired a single bit because of the effort put into making them look like guns.

Fortunately, we started out with good telescopes and the trend has been very definitely toward those which suited our needs best. There is a need for mount improvement. One fine manufacturer seemed to recognize it and spent a great deal of money in the wrong place. Many of us bemoaned this fact and have tried to use his scope at considerable expense to us by replacing those mounts. There is still a great need for improving the platform to which the mounts are attached so that they may be broader and more stable. The shooters have recognized in recent years that there can be a definite advantage to mounting both the front and rear blocks on one surface and thus avoiding variations in the heat expansion and vibration.

Perhaps the big news of the day is the improvement in triggers. Some of the shooters who have the design ability and the fortune costing precision manufacturing equipment at their finger tips have made steps towards improving triggers, but I think it is fair to say that the preponder-

(Continued on Page Nineteen)

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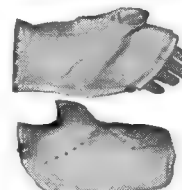
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## Rebuilding The Colt Single Action

(Continued from Page Five)

fixed sight guns, windage is set by the positioning of the front sight when turning in the barrel. You may want to proof fire and check sighting at the same time before you finish up the gun. My luck is good, and when I have set them dead vertical by eye, they have been within an inch to an inch and a half of correct windage at 20 yards. If the barrel is fitted tightly enough, the windage is easily adjusted as required.

The tail end of the barrel needs a little relieving to prevent lead shaving. Look at some factory barrels. The best jobs are neatly coned barely more than the depth of the rifling. To do this, find a rimless cartridge case that fits about half way up the shoulder into the barrel. Smear on a little valve grinding compound, chuck it up, and twirl it a while in the breech end of the barrel. Don't overdo it. A tapered dowel with fine emery cloth glued on works well, too.

If you intend to fit new grips, this should be done before giving the frame and straps their final polishing. Put the grips on the gun and final trimming can be done right in place, filing and sanding right to the metal. Be careful not to mar the gun. Little slips can now be polished out before the parts are finished.

While the hand bolt, and trigger have been cleaned up or replaced, some adjusting may be required. It is the purpose of the bolt to lock the cylinder in line with the barrel after the hand has rotated it into position. If the hand is worn, it may not turn the cylinder far enough for the bolt to lock into the bolt cut. If so, it must be replaced. If the hand spring is badly worn, replace it. It drives out sideways, and the new one may be started with a wood block and pressed in with a vise. Sometimes a new hand is too long, and turns the cylinder too far. It should then be carefully filed and stoned down to prevent strain on the bolt and hand when cocking the gun.

The bolt should be a reasonably good fit in the bolt cuts on the cylinder. New bolts are likely to be too tight, and must be stoned down to fit the cylinder cuts. Do this carefully with a fine stone, tapering the side that will be toward the center of the frame when assembled. Confine this taper to the very top edge (the bolt cut on this side is not very deep), and remember that there is not much to take off. This system leaves the bolt full where it bears in the frame for tightness, and keeps the positioning face (on the outside of the bolt) straight and full.

Put the gun together and check out its functioning and timing, making necessary adjustments along the lines suggested. The mechanism is simple, so that you should be able to see easily what may be needed. Check the cylinder alignment to the barrel as carefully as you can, using as a feeler a polished rod or dowel that just fits through the barrel. You can also get some idea by shining a light through the firing pin hole of the frame, and looking down the barrel. Misalignment of over a few thousandths can usually be detected, and, if serious its cause should be determined. Altering the bolt will correct small amounts.

Stone the trigger pull to suit. Keep the mating faces flat, and reduce their area only after polishing and truing up fail to lighten the pull to your liking. Three to four pounds is light enough for these guns.

If everything fits and functions perfectly now, you are ready for refinishing. This will usually mean bluing (also called browning, even if the color turns out to be black or purple). Even the frame is usually blued on this type of rebuild. Not only

is it a more durable finish than the case-hardening colors, but many of these guns were originally blue, and many others were refinished blue at the factory. The amateur can not produce the original heat treating colors, and should not try. These colors may be simulated chemically, but it takes a lot of practice, and the result, however done, is not very durable. If you must have casehardening colors, send the gun to the Colt factory for refinishing. We will confine ourselves here to a blue finish.

The factory new parts can be used as is, with small mars being touched up with any of the good instant blue solutions made for the purpose. The rest of the parts can be blued, if you like, with one of the hot solutions as popularized by Clyde Baker. With these the cleaned parts are boiled in clean water, and successive applications of the hot bluing solution made to the hot parts with a clean cotton swab. The parts are scratched with fine steel wool between boilings and application. Directions come with each of the many preparations sold by the supply houses. It takes about two hours, total time, to complete a job by this method, even if the ads suggest less. Revolver parts being small, you will find stainless steel or Pyrex saucepans to be large enough. The heating can be done on the kitchen stove or on a hot plate.

The rear end of the barrel where you worked on it and the heads of screws, or other very small parts, should be done with an instant blue, as well as the touching up of scratches referred to. The whole gun can be blued with them too. The manufacturers of these and most authorities do not recommend doing so because of the many poor jobs of "bottle bluing" that have been done. In many of these cases, the same man would have done a poor job with any blue.

If you are tempted to try a quick blue, here are some suggestions. The gun must be as well prepared and as clean as you can get it, or as is required for any other method. Apply at least six coats, even though one is supposed to do it. Rinse, dry, and degrease the parts between each application, just as other methods demand. Keep the pieces warm, about as hot as you can hold on to. When you think each part is fully colored, wipe alternately and rapidly with carbon tetrachloride (good ventilation required) and the bluer, then wipe with the two swabs side by side. As soon as one swab gets dirty, start a new one. Rinse the parts in clean hot water, and dry with clean rags. Thus far you will have used up an hour. Now lay them aside in dry warm air for at least 24 hours, then burnish with a clean wool cloth. A sock or your old vest front (clean!) will do. Oil as required, but do not wax. Done in this way an instant blue will look creditable, and will give good service on a revolver. The slower blues are better, if done right. That is the catch with any of this work.

Well, that ought to do it. Your Single Action should look, feel, and shoot like new. You will enjoy it the more because of the pleasant hours you have spent restoring it to usefulness. You will know your gun as few shooters do. Its adjustment and maintenance will be undertaken with confidence.

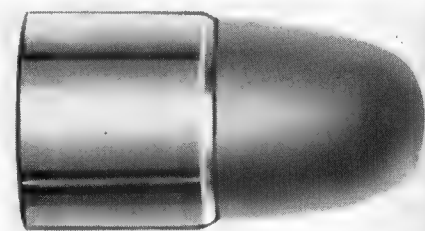
## THE SHOP

Roy F. Dunlap

Nothing technical much—few miscellaneous things to talk about. Should have written up some dope right after the last National Matches. Little late now, but match conditioned M1's with tension on forend and tight bedding should have trigger-guard unhooked before laying away for months. Otherwise you don't have so much tension next season.

I've become irritated at the kid-rifle situation; people now starting kids shooting when they're as young as eight, and even the so-called "junior" rifles won't fit a fair-sized thirteen-year-old. The irritating part is that papa thinks his eight or ten year old offspring should be able to shoot if he (or she) can just reach the trigger. Daddy wouldn't do so well if he had to shoot a 22 pound rifle with a twelve-pound trigger, would he? Well, that's just what he asks an 80-pound child to do with a seven-pound rifle with a three-pound pull. It doesn't figure out purely on mathematics as a straight comparison—you must also remember that a child's strength is not the same as an adult's. He is hard-muscled, able to summon more strength for a few seconds than an adult in proportion to weight, but he cannot maintain an effort as long. His hands are smaller so he has less "leverage" to handle a trigger, especially since all the stock grips are much too long for him. Try holding your hand away back and squeezing a heavy trigger with a finger-tip—you'll get the idea. A youngster does not have the muscular control of an adult and learning to squeeze a trigger is quite a chore. His control is not as fine—a one-pound trigger is too light for most kids to handle, a three-pound too heavy. A variation of one pound is to him as much as perhaps a four-pound difference to his father. (What brought this on is that I got to build a midget .22 and find it's a headache—made one about ten years ago for a five-year-old, three pounds complete with target sights and sling, but forgot how much trouble it was!)

.22 shooters at Perry still kicked about the three-pound trigger rule; still expect no changes. Nothing new in equipment of vast importance. The AAMU long-range riflemen turned up with spirit-levels on front sights—claim they help, and their scores sort of backed up the talk. At 1000 yards of course a little cant variation hurts a lot. So we'll go back a couple generations to the Scheutzen days—they used the spirit-level front sights. Six or seven years ago I made a spirit-level attachment for one of our international shooters—didn't go on front sight, but clamped on scope block. He found it wasn't necessary for the short ranges involved.



## SPEER "PLINKERS" BULLET

The Speer Products Company, Lewiston, Idaho, have announced the addition to their line of rifle bullets of a .30 caliber, 100 grain, half-jacketed swaged bullets, which they have named "PLINKERS."

The new bullets were designed primarily as an inexpensive (\$2.85 per hundred) bullet for varmints, small game and just plinking. The Speer Company state that their tests of the PLINKERS show them to have surprising accuracy at velocities up to 3200 f/s, and that they disintegrate on impact to largely eliminate ricochets.

Loading data for all common .30 cal. cartridges will be included in each box of the PLINKERS. It is expected that the new bullets will be available at dealers by March 1st. They will be an interesting item to try out.



## MORE ON THE .222 REMINGTON MAGNUM

By Harold W. Harton

Quite often we have things that we desire right under our noses and never realize it. One of my desires has always been to own a .219 Don Wasp. For some reason or another I just never got around to getting one. One reason, I suppose, is because of the trouble of making cases. This is definitely a drawback to any wildcat case that demands the shortening of the brass. Usually a wildcat such as the popular .25-06 can be made by simply necking down the case. This is no more trouble than resizing. Nevertheless, because of the necking down, shortening and fireforming of the .219 Don cases, I resigned myself to be satisfied with the .222 Remington.

However, as soon as the .222 Remington Magnum came out I immediately became interested in the size of the case. After a few measurements and checking the case capacity, I found out that I had a rimless .219 Don Wasp. For the record, I personally wouldn't turn around for the difference between the two. However, I will be quick to add that I have still not owned a .219 Don and therefore cannot say what the difference in the field would be. Ballistically, however, there just isn't any difference. And according to the winning list of equipment in the bench rest matches there must not be too much difference in accuracy.

I have been shooting the .222 Remington Magnum for about a year now and can say for sure what it will do in the field. Everything from factory loads to my own handloads shoot much flatter than is indicated by the ballistic tables. One of the best loads for crows and hawks when the wind isn't too high is the Sisk 41 grain bullet with 25 grains of 4198. This load gives 3868 fps velocity in a 26 inch barrel and is a top load, and therefore should be worked up to, starting with about 23 grains. Incidentally, I saw one deer killed with this load. The deer was a fat doe weighing about 100 pounds. She was standing in a clearing about 100 yards away. The bullet hit her in the neck about half way up. It tore about a two inch hole in the spine and blew out an exit hole a good three inches in diameter.

Another load I like is Mr. Sisk's 49 grain Bench Rest bullet in front of 29 grains of 4320. This is my favorite all around load and gives me 3400 fps velocity. I get one inch 10 shot groups at 100 yards with my 722 Remington .222 Magnum, and with only a 6X Bear Cub scope. I consider this excellent accuracy.

If one will compare this .222 Remington Magnum to the .219 Don Wasp I think he will think much more of the .222 "Maggie."

## SOME "MONKEYING AROUND" WITH POWDERS

Phil Teachout

While monkeying around with trying different powders in my Springfield Sporter last summer, I selected charges in the same velocity range as published in the loading manuals with the thought that this would result in approximately the same points of impact at the target. The resulting points of impact had less variation than I had suspected would be the case. I tried it again later with a different bullet and had similar results. I had earlier, by trial-and-error, arrived at charges of two or three different powders to give close to the same point of impact in other rifles, of different calibers.

When writing to a shooter friend late in the season I mentioned these experiences. He replied, in effect, that I was full of prunes; making the points that different

loading manuals listed different velocities for the same charges, that the burning-rate range of the powders I had used were not greatly different, that my shooting had been with relatively heavy rifles, etc., etc. At that time some of his points were true, but for some he had jumped to conclusions not so true. At any rate, I didn't think I was "full of prunes," but determined to investigate further before debating that point too loudly. Now, some two months later, after the expenditure of some 500 rounds of ammo plus considerable loading and shooting time, I am convinced that my earlier experiences were no "fluke."

It is true that different velocities are published for the same powder charges in different loading manuals, but, in general, those differences are no greater than may be, and often are, the extreme variation in velocity obtained in the chronographing five rounds of the same load to arrive at an average velocity for the load.

My "monkeying around" has been **ONLY** to try to determine variations in point of impact. Charges of different powders were selected to give velocities (as published in the loading manuals) in the same approximate range, all other features of the load being the same for a given "test". Charges were selected within a 50 to 60 fps velocity range in order to keep charges in no less than half-grain units. Powders used were those I had on hand and for which loads were published. Loads were kept 5% to 10% below published maximums. In each test, 5-shot strings with all powders being used were fired on the same target to get a composite for direct comparison; fire 5 shots with one powder, walk to the target and mark the bullet prints, and repeat for the other powder loads. Point of aim was kept constant in each test. Following are rifles and loads used, and results obtained.

Rifle .219 Donaldson with 1½ inch bull barrel weighing 15¾ lbs. with Unertl 2 inch scope. This is not a too accurate rifle, having a life-time average of only .900 m.o.a. Bullets were home swaged 53 gr. in Sierra .705 jackets. Loads were; 25 grs. 3031; 27.5 grs. 4064; 29 grs. 4320; 21.5 grs. 4198; 27 grs. Ball C. At 100 yards the loads merged into composite groups of 1.25 and 1.485 inch. At 200 yards, 50 shots fired on one target merged into a 4.5 inch composite, with 4064 and Ball C showing a bit the higher point of impact.

Rifle .257 Roberts sporter weighing 9 lbs. with Bear Cub 4X scope and sling. With home-swaged 83 gr. bullets made in Sierra .860" jackets, loads were; 37.5 grs. 3031; 40 grs. 4064; 40 grs. 4320; 45 grs. 4350. Two series of 5 shots each with each powder were fired at 200 yards. Charges of 3031 and 4064 had same point of impact with 4350 having ¾ m.o.a. and 4320 1½ m.o.a. lower point of impact.

With 60 grain Hornady S. P. bullet and charges of 33 grs. 4198; 37 grs. 3031; 41 grs. 4064; the charges of 3031 and 4064 had same point of impact at both 100 and 200 yards while the 4198 charge was ¾ inch lower at 100 yards and 2¼ inches lower at 200 yards.

Rifle .308 Win. in Savage 110 MCL featherweight rifle weighing 7½ lbs. with old Weaver 440 scope and sling. With 145 gr. home swaged bullet made in 1.085" Sierra jacket and charges of 40 grs. 3031; 43 grs. 4064; 44 grs. 4320; 50 grs. 4350; two 5-shot and one 10-shot strings were fired with each charge at 100 yards. The 3031 and 4064 loads had a point of impact 1 m.o.a. higher than the 4320 and 4350 loads.

With a Hornady 150 grain round point bullet and same powder charges as above, the points of impact and relative variation were essentially the same as with the 145 (Continued on Page Eighteen)

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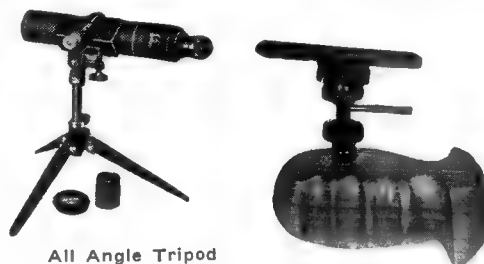
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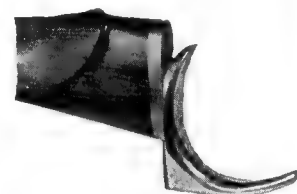
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### The Information Bench

(Continued from Page Nine)

load, but we simply used that charge for a starter. We may settle on the new W-W Ball powder No. 295HP.

Winchester strongly advised against converting the M92's, although I've owned several, and know of several others that have not given any trouble at all with heavy handgun loads. You shouldn't have any trouble in working up a near max load for your particular piece, with your bullets. There is a great deal of variation in these conversions, and the guns were originally intended for much lower pressure cartridges. You can understand why I must go a bit slow in recommending specific top charges until data are complete.

All of these guns are made of soft steel, and I believe your low number is just as strong as higher numbers in identical condition. Sorry I can't be of more help at present. Watch this column and loads will be there as soon as available. Kent Bellah

Letters

(Continued from Page Seven)

We could plainly see mirage moving the bull around through the 10X transit scope with crosshairs. So I immediately wrote John Unertl about fine crosshairs in spotting scopes, but it seems that it is rather difficult to put them in due to focusing of eyepieces and all.

This is too long.

Yours,

Roy Dunlap

### UNDERSTANDING

Dear Phil:

I just received the last Precision Shooting and I was interested generally in every article. I took especial interest in Mr. Stinehour's follow up in Beginners Corner. I, also, took exception to his comment concerning the "movement" of a bullet with mirage. At the moment I did not think it too important but subsequently my reasons have been born out; hence I write this line.

On my first reading I thought that Mr. Stinehour's statement was merely an unfortunate one that evolves by chance once in a while when some one is expressing a point. Subsequently, in the January 1961 issue, Mr. Stinehour almost commits his



form of statement to a philosophy. Mr. Stinehour is concerned with **understanding** and I think that is what we all are concerned with most of the time.

A magazine like Precision Shooting exists, probably, in order to further understanding. It seems to me that Mr. Stinehour should rethink his approach toward this specific situation and towards others resembling it. Being a teacher I am interested in the process of **understanding** and how one arrives at making it a reality. It has been my experience that you cannot take short cuts. I agree wholeheartedly that we must simplify in order to present the information in such a fashion that it is comprehensible to most folks. The danger in simplifying, though, is that you may start a person off in the wrong direction due to a poor choice of words. It seems to me that Mr. Stinehour's statement will do this with some of his less sophisticated readers. It is possible to simplify and still start the uninitiated off on the right track without confusion. I am sure that Mr. Stinehour will agree with me on this point. This comes to why I am writing this letter.

When simplifying we must be cautious that we convey the information correctly so that the reader gets the right twist. If he does not get the correct twist and then later must **relearn** a new one we have really delayed education by contributing poor information. It has been my experience that if you start someone off with good, clear, organized, thinking patterns in any area it is amazing how soon they are able to understand phases of the same problem that are pretty complex. The trick is in laying a good firm foundation. You don't lay this foundation with inadvertent statements which may produce misconceptions among some readers. I am sure that Mr. Stinehour will agree with me on this point too.

I hope that it is clear that I am not attacking Mr. Stinehour in any way. The reason I write is that I feel the point at issue is a very important one that goes into areas far beyond one article in Precision Shooting. I feel that if you choose your words with the same precision that you choose your bullets you are bound to get the desired results.

Dale F. Rowe  
Needham, Mass.

## MINUTE-OF-ANGLE SPORTERS

Dear Sir:

..... I am very much prompted to write about something which I believe would somewhat clear the air regarding the seeming age-old and largely differing opinion as to what constitutes a minute-of-angle rifle. There are those who feel that a sporter which will put three shots into the minute-of-angle at 100 yards is indeed a minute-of-angle rifle. Opinions then graduate to a scale involving years of testing and hundreds of rounds fired.

Now, as to a sporting rifle, I would feel that the most important requisite of the arm from an accuracy standpoint, so far as shooting at game or varmint, is that it deliver its first shot from a clean cold bore to point of aim. Where the second, third or succeeding shots will be placed is secondary, to me at least. This does not discount the very desirable quality of having a close grouping capability in a series of shots from a cold clean to hot fouled condition. However, I have digressed from the intent of this letter, which is to **propose a standard** for determining what constitutes a minute-of-angle rifle.

It would seem to be practical to apply the NBRSA National Match Courses of fire to the applicable rifle under test in-

cluding those provisions regarding rests, scope, weight, calibre, etc. The only exception to the rules which seems in order, due to the title given the "sporter" and "varmint" classes, is that tests of these rifles disallow any sighting or fouling shots prior to or during the conduct of the MOA (minute-of-angle) test. This exception is not unreasonable in light of the fact that the intent or basic fundamental purpose of a sporter or varmint rifle is to hit a live target, as opposed to punching a hole in a target, and that it seems illogical to suppose that the rifleman would be taking fouling or sighting shots when afield after a live target.

As to the actual certification of the rifle I would suggest that if the test were conducted as outlined, in the presence of three witnesses one of which was a member of the NBRSA who would act as referee and judge, and that the targets were signed by the witnesses who would also affix their signatures to a statement on which the pertinent information regarding rifle, etc. was placed; the shooter would have representative proof that he and the rifle did achieve MOA and that the rifle could be called a minute-of-angle rifle.

Obviously we are to assume that this type test is going to have most appeal to the Sporter or Light Varmint type rifle as the heavier rifle without the MOA capability is no longer competitive and there is not much argument raised when one claims MOA capability in the heavier weight classes.

I feel we have here in the proposal just outlined an excellent tool to stimulate interest in bench rest shooting. It could be a significant step in the "shooting for record only" portion of our matches which has not been recognized or taken advantage of to encourage the novices, into which class I most certainly fall!

Possibly the NBRSA could instigate and provide a certificate to be presented to a shooter who achieved the MOA in a "record only" NBRSA shoot. Certainly, the certificate would enhance the intrinsic and real value of any rifle of the light or medium weight sporter class.

Ralph R. Saylor  
Alamogordo,  
New Mexico

## LATE CORROSIVE PRIMERS

Dear Phil:

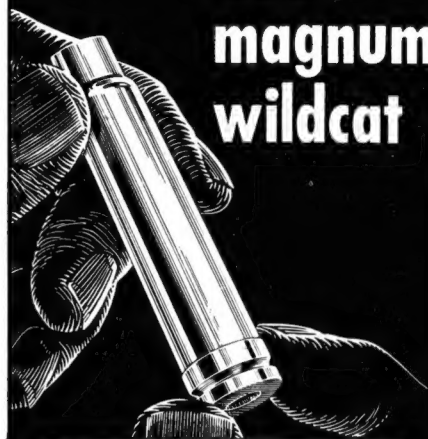
I enjoy reading your magazine every month and find it full of valuable information. I particularly enjoyed the article in the December issue on "Obsolete Military Rifles" by Mr. Remmel, the gunsmith from Arkansas. I agree with him wholeheartedly down to the last sentence. Here he implies that all G. I. ammunition made after 1950 may be considered to be of the non-corrosive type, except of course the carbine stuff which is all non-corrosive.

In a recent article in the AMERICAN RIFLEMAN the technical staff states that we may expect .30-06 ball rounds from the St. Louis Ordnance Plant (headstamp "SL") to be corrosive until lot 9420, which was manufactured in May of 1952. The article further states that .45 M1911 ball rounds from Frankford Arsenal (headstamp "FA") to be corrosive as late as lot 1542 of July 1954, and .30-06 A. P. rounds to be corrosive until lot 22007, manufactured in June 1954 by Winchester ("WRA").

Other than this I think the article is very true, especially the part about the ignorance of the average American regarding the metric system and our equivalents.

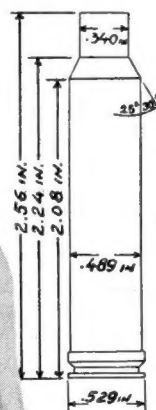
Jerry Dykes  
Vicksburg, Miss.

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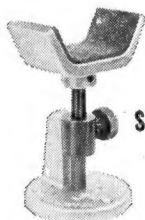
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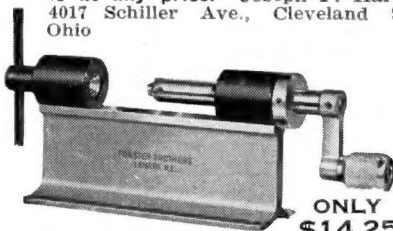
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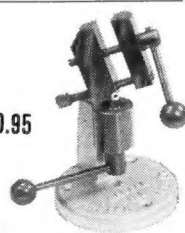
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## Some "Monkeying Around with Powders"

(Continued from Page Fifteen)

grain home-made bullet.

With Sierra 110 grain Hollow Point bullet and charges of 46 grs. 3031; 52 grs. 4350; 39 grs. 4198; a string of 5 shots was fired with each charge at each 100 and 200 yards with less than 1 m.o.a. difference in point of impact at both ranges; the 3031 load highest, 4198 in middle and 4350 lowest.

Rifle .30-06 Springfield NRA Sporter weighing 10½ lbs. with Unertl 1½ inch target scope and sling. With 145 gr. home-made bullet and charges of 46 grs. 3031; 50 grs. 4064; and 57 grs. 4350; five shots with each charge were fired at each 100, 200 and 300 yards. At 100 and 200 yards the 3031 and 4064 charges had a 1 m.o.a. higher point of impact than 4350. At 300 yards, 4064 was 1 m.o.a. and 4350 2 m.o.a. higher than the 3031 charge.

With Speer 130 gr. Hollow Point bullet and charges of 48 grs 3031; 51 grs. 4320; 52 grs. 4064; 61 grs. 4350; firing one 5-shot string with each charge at each 100 and 200 yards, the 3031, 4064 and 4350 charges had approximately the same point of impact and 4320 was 1½ m.o.a. lower.

With Norma 187 gr. boat-tail Match bullets and charges of 45 grs. 3031; 47 grs. 4064; 48 grs 4320; 54 grs. 4320; two 5-shot strings with each charge were fired at each 100 and 200 yards. At 100 yards the point of impact of the 3031, 4064 and 4350 charges were approximately the same, with 4320 2 m.o.a. lower. At 200 yards the 4350 charge was 1 m.o.a. higher and 4320 2 m.o.a. lower than the 3031 and 4064 points of impact.

From the foregoing it would appear that one can pick a charge of powder to give very nearly the same point of impact as from another powder being used, by reasonably matching the velocities published in the loading manuals.

In general the 4320 loads gave a lower point of impact than other powders in a series tested and would require one or two grains heavier charge in the sporter rifles used for these tests.

While these were not accuracy tests, in some of the series charges were selected to match a load of known good accuracy and, in general, in these cases the other powders gave nearly, if not quite, equal accuracy. In nearly every case the variation in group size as between the different powders was little if any greater than might reasonably be expected from a series of 20 or more groups from the same powder and charge. So far as this shooter is concerned, the human variable is at least as great as are the normal variables in rifle and ammunition.

All of the shooting reported was done from bench rest, located in the front of an open shed, in temperatures ranging from 20 to 35 degrees above zero. In all but one of the series fired, all loads were in the same make of cases. In most of the series, but not all, primers of the same make and lot were used.

Other shooters, with other rifles of the same calibers, might get somewhat different results from similar tests, but I think, in general, they might be reasonably comparable.

These tests reported are admittedly of no great importance, but to this writer and shooter they were interesting and the results may quite possibly be of some future worth to him.



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## Hollow Point Bullets

(Continued from Page Three)

he reported that during the summer a fair sized black bear was shot with one of them, loaded in .30-06 case, again a chest shot in the shoulder area without hitting any heavy bone, with through-and-through penetration and sizable exit wound. And again, the bear did not drop at the hit but went down to stay within 50 yards.

Earlier I had given a woodchuck hunting friend some .22 caliber home-made bullets that I did not consider quite good enough for match use but of ample accuracy for hunting. He reported that in his .22-250 the bullets gave good accuracy but not the blow-up expansion on chucks that the commercial soft-point bullets he normally used did. My own experience with these bullets has been that poorly placed hits permit wounded chucks to get into their holes.

These experiences are entirely too few to even think of basing an opinion on—I still doubt these hollow-point bullets are reliable for big game shooting—but they do arouse curiosity which I shall try to satisfy as the future permits. I would welcome reports of any first-hand experiences of others, and the door is open for comments, pro or con.

I might mention that the Sierra jackets I use are relatively heavy and thick walled. The Sierra 1.085" jackets used in making the .30 caliber bullets weigh 55 grains, or 38% of the 145 grain total weight of the bullet. The jacket walls must be thickened somewhat in forming the nose section and this may have some bearing on good penetration with delayed but even expansion of the bullet.

PHT

## Stool Shootin' Stuff

(Continued from Page Thirteen)

ance of effort has come from the arms manufacturers, due to the consistent demand of the vast field of shooters and the effort on the part of the manufacturers to provide our National Service Teams with equipment which will aid us in attaining superiority in International competition.

No radical change in bullet design has actually occurred during recent benchrest history but the superiority of the open point bullet seems to have been clearly demonstrated. Lead pointed bullets have continuously dropped back as users recognized that they could not be depended upon for

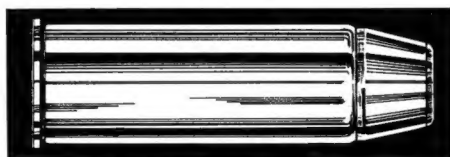
small groups. Just look, however, at the tremendous improvement in minor detail that has occurred, details which can best be performed by the shooters themselves to the extent of making their own bullets. These details are known to the commercial manufacturers but just as we in this country have trouble as our labor competes with that in foreign lands, the commercial manufacturer faces the dilemma of trying to have his product arrive at the shooters hands through several profit making stages and be within the reach of thousands of pocketbooks. All this because the "do-it-yourself" fellow is willing to contribute free, his labor and a long series of minute and careful inspections. Both Speer and Sierra are entitled to our deepest bows for recently having presented to us fine lines of accurate bullets and to Sierra, we must be doubly grateful because they have recognized our demands for superbly accurate jackets and have presented them for our purchase at a very moderate price considering their marvelous uniformity. If we do not get good bullets from such jackets, it is because we as workshop producers muffed the ball in one or more plays.

No recap of improvements would be complete if we did not think of those which pertain to shooting technique. In the old days, a group was made with minor consideration for wind and mirage on the assumption that the wind was there and would stay throughout the firing period for the group and the same applied to the mirage if the shooter was far enough along to consider and recognize mirage. Except in rare conditions, nothing could have been further from the truth. The wind or mirage are seldom consistent for even half of the match and most all of us have found ourselves in matches where it has varied ten different ways. A good group generally boils down, providing the equipment is good, to whether or not one got caught or didn't get caught. It is just as simple as that and you only have to get caught once to be a long way behind the fellow who didn't get caught. That once may cost you the trophy for a four day shooting match. Is there any wonder that we are all now most seriously trying to train ourselves to accurately compete with wind and mirage as well as with our fellow shooters.

There are probably a lot of things that I have left out, Phil, as far as improvement is concerned but there is one thing that I look forward to as being of continuous need, and that is to improve the comradery, tolerance and good sportsmanship of we who shoot together. The standard is way high now; let's keep it mounting.

Cordially yours,

*Crest Stihlchuter*



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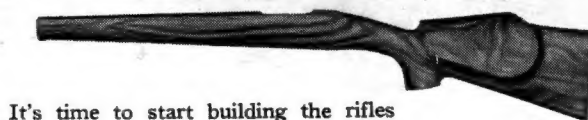
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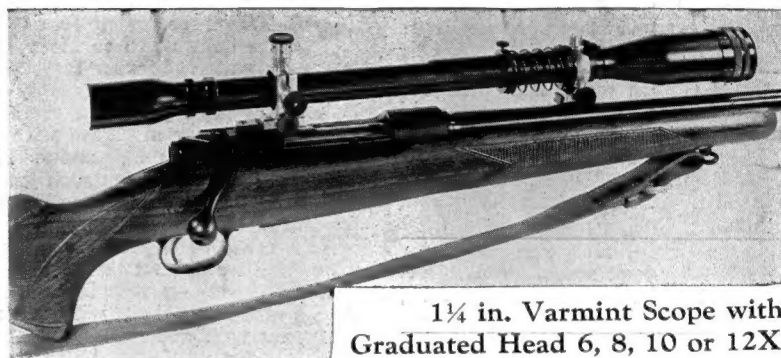


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# DOUGLAS ULTRARIFLED BARRELS

## WORLD'S FINEST PRODUCTION MADE RIFLE BARREL

The quality of DOUGLAS barrels has been proven many times on the target and in the field, both big game and varmint shooting. These barrels hold many records on the target, in bench rest, big bore, and small bore target work. We receive new reports all the time, attesting to their excellence, from the target shooter and hunter. We feel that we are making the finest production made rifle barrel available in the world today. Further, our wide range of sizes and weights, variety of calibers, deliveries, prices and discounts to gunsmiths, add up to a service that is not available from any other barrel maker in the land.

### AND NOW DOUGLAS OFFERS BUTTON RIFLED MUZZLE LOADER BARRELS

The finest muzzle loader button rifled barrels available anywhere regardless of price. Made from octagon shaped steel with a smooth cold drawn finish to finish up to 42" long, rifled with 8 lands and grooves, and rifling twist of one turn in 48". Available in three sizes of steel, 7/8" across the flats in calibers 32, 36, and 40 (40 caliber will be cut rifled), 1" across the flats in calibers 36, 40, and 45 (45 caliber will be cut rifled), and 1 1/8" across the flats in 40, 45, and 50 calibers. Any of the above sizes and calibers at only \$32.50 each. Subject to regular gunsmiths discounts.

WRITE FOR FREE LITERATURE ON THESE BARRELS AND THE OTHER FINE BARRELS THAT WE MAKE.

G. R. DOUGLAS CO., INC.

5504 Big Tyler Road

Charleston 2, W. Va.